ORDER NO.HAD8705148A4
A6

Service Manual

Compact Disc Player

COMPACT disc DIGITAL AUDIO

DIGITAL

SL-P117

Color

(K) .....Black Type

Area

color	area
(K)	(PA) .....Far East PX.
(K)	(PE) .....European Military.

Please use this manual together with the service manual for Model No.SL-P117, Order No.HAD8703018C1.

Notes; * Mentioned in this service manual are the differences from Model No.SL-P117 for destination (M) area.

CHANGES

■ REPLACEMENT PARTS LIST

Note: Mentioned in this parts list are only those different from Model No.SL-P117 for the destination (M) area. Other parts are the same as for Model No.SL-P117 for destination (M) area.

Ref.No.	Change of Part No. (M)	→ (PA)(PE)	Part Name&Description	Remarks
FUSES				
F1 ⚠	----------	**XBA2C025TB0**	250V, T250 mA	Addition
COILS AND TRANSFORMERS				
T1 ⚠	SLTD5K027SC	**SLTD5K030SX**	POWER TRANSFORMER	
SWITCHES				
S2 ⚠	----------	**SSR187-1**	SW, VOLTAGE SELECT	Addition
CABINET AND CHASSIS				
1	SGPLP117-KM	**SGPLP117-KPA**	CHASSIS	
2	SDSJ16	**SJS9236**	AC SOCKET	
29	SJS9331A	----------	AC OUTLET COVER	Diletion
30 ⚠	SJS9331B	----------	AC OUTLET	Diletion
ACCESSORIES				
A1	SQUD197	**SQUD249**	INSTRUCTION MANUAL	
A2 ⚠	SJA175-1T	**SJA168-1**	POWER CORD	
A4	----------	**SJP2257**	CORD, SYNCHRO-REC	Addition
A5 ⚠	----------	**SJP9215**	AC PLUG ADAPTOR	Addition
PACKINGS				
P1	SPND192	**SPND192-1**	CARTON BOX	

Technics

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P.O. Box 288, Central Osaka Japan

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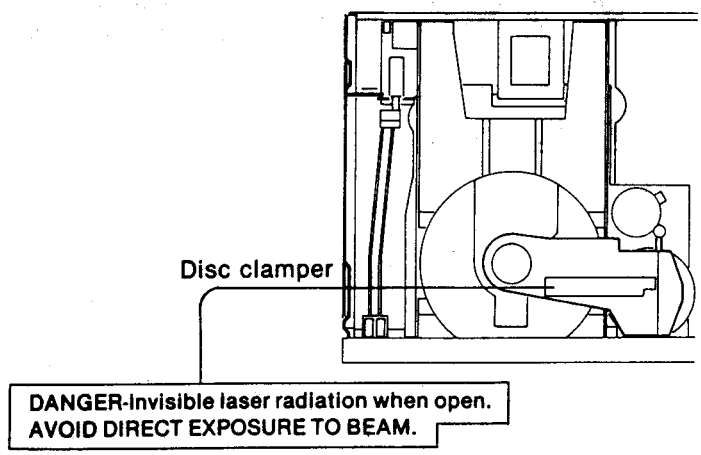
6th Floor, World Trade Center Bldg.,
No. 4-1, Hamamatsu-cho 2-Chome, Minato-ku,
Tokyo 105, Japan

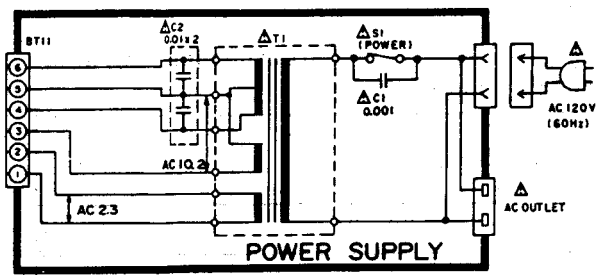
■ PRECAUTION OF LASER DIODE

Caution: This product utilizes a laser diode.

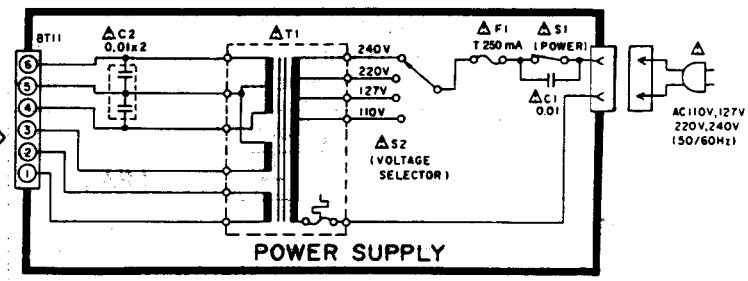


■ SCHEMATIC DIAGRAM

- **Power supply circuit**

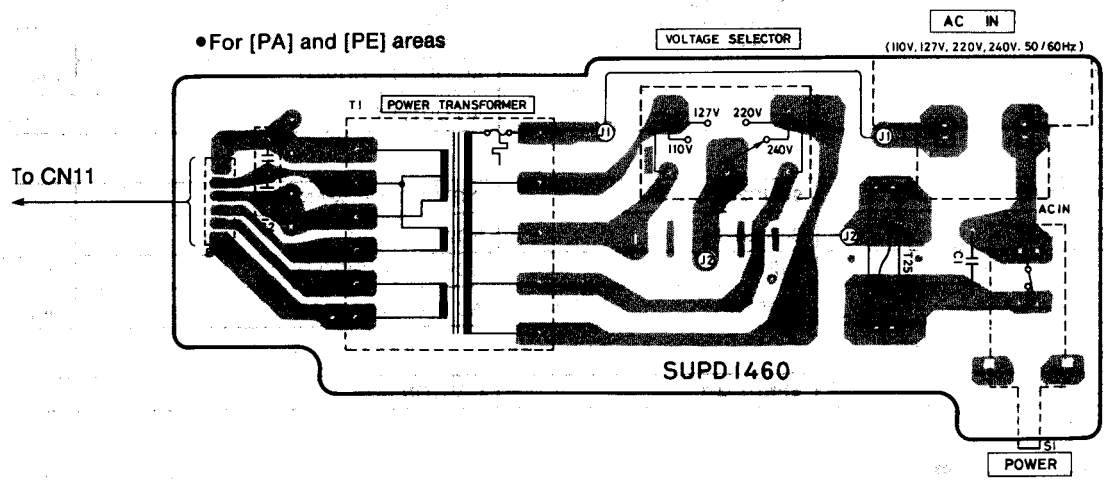


- **For [PA] and [PE] areas**



■ CIRCUIT BOARDS

- **Power source P.C.B.**



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Compact Disc Player

SL-P117

COMPACT disc DIGITAL AUDIO

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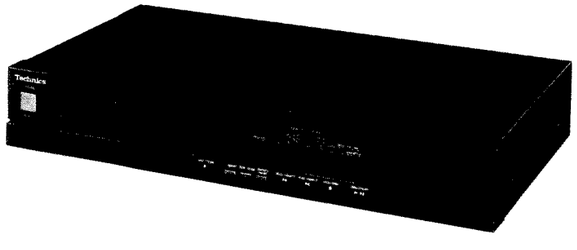
Compact Disc Player

Color

(K).....Black Type

Area

Color	Area
(K)	(M).....U.S.A.
(K)	(MC).....Canada.



SPECIFICATIONS

■ Audio

Number of channels: 2 (left and right,stereo)
Frequency response: 2~20,000 Hz (EIAJ)
Dynamic range: 92dB
S/N ratio: 96dB (EIAJ)
Harmonic distortion: 0.004% (1kHz,0dB)
Total harmonic distortion: 0.006% (1kHz,0dB) (EIAJ)
Channel separation: 96dB (EIAJ)
Wow and flutter: Below measurable limit
Low-pass filter: High-resolution digital filter

■ Signal Format

Sampling frequency: 44.1kHz
Correction system: Technics Super Decoding Algorithm
D-A conversion: 16-bit linear

■ Pickup

Access time: 1 second (access to the last track)
Light source: Semiconductor laser
Wave length: 780nm
Traverse system: High-speed linear access system

■ Functions

Automatic play: All tracks
Direct access play: Track number
Repeat play: Entire disc or programmed tracks
Search: Forward/backward track skip
Forward/backward manual search
Program play: For up to 20 selections
Preset edit play: Up to 99 minutes (for program play)
Display: Total tracks
Current track
Programmed order
Time display: min.,sec.
Indicators: Play indicator
Pause indicator
Repeat indicator
Disc indicator
Disc loading: Motor-driven horizontal type
Remote control terminal: 1/8 inch stereo

■ General

Power supply: AC 120V, 60 Hz
Power consumption: 10W
Output voltage: 2V (at 0dB) (EIAJ)
Output impedance: Approx. 550Ω
Load impedance: More than 10kΩ
Dimensions(WxDxH): 43 X 24 X 7.7 cm (16-15/16" X 9-7/16" X 3-1/32")
<When disc holder is opened: 37.2 cm (14-21/32") (D)>
Weight: 3.1kg (6.8lbs.)

Specifications are subject to change without notice.
Weight and dimensions are approximate.
Measured by EIAJ (CP-307).

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Technics

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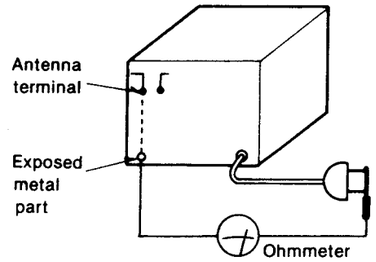
■ SAFETY PRECAUTION (This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

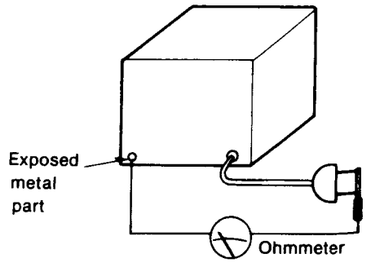
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

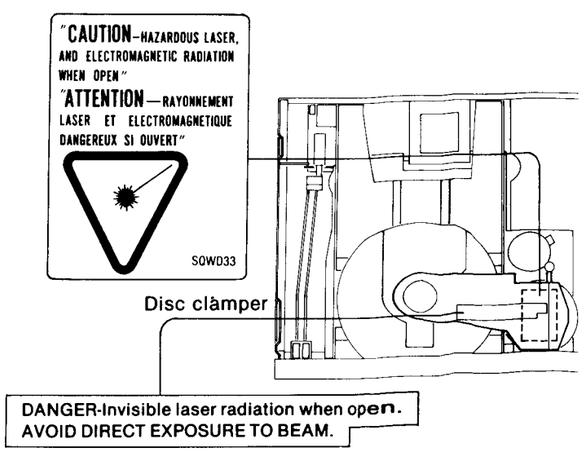
■ PRECAUTION OF LASER DIODE

Caution: This product utilizes a laser diode.

• Use of caution label

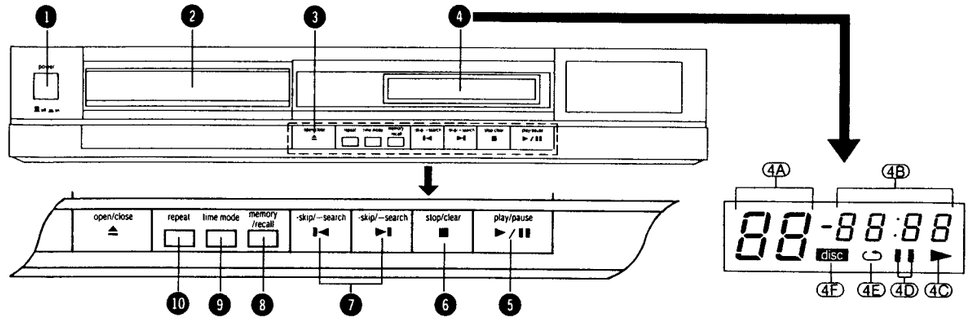
Area	Disc clamper	SQWD33
U.S.A.	○	×
Canada	○	○

Note: ○ Mark is used, × Mark is not used.


"CAUTION—HAZARDOUS LASER, AND ELECTROMAGNETIC RADIATION WHEN OPEN"
"ATTENTION—RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT"
SQWD33
Disc clamper
DANGER-Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM.

■ LOCATION OF CONTROL

Front panel



❶ Power switch

❷ Disc holder

❸ Open/close button

❹ Display panel

④A Track number display (track)
Track numbers (up to 99) are shown here.

④B Time display
This display shows four time modes and programmed order.

④C Play indicator (▶)
Illuminates when the play mode is activated and goes out when the play is stopped.

④D Pause indicator (▮▮)
Illuminates when the pause mode is activated and goes out when the pause mode is cancelled.

④E Repeat indicator (⟲)
Illuminates when the repeat mode is activated and goes out when the repeat mode is cancelled.

④F Disc indicator (disc)
Flashes on and off when the disc holder is opening or closing.
Illuminates when a disc is in the holder (if power is on) and the disc holder is closed.

❺ Play/pause button

This button activates either play or pause, depending on the operating mode of the unit.

1. If the button is pressed while the unit is in the stop mode or in the pause mode, play begins and the play indicator illuminates.
2. If the button is pressed during play, the unit goes to the pause mode, and the pause indicator illuminates.

Pause mode:
The disc rotates while the unit is in the pause mode.

❻ Stop/clear button

This button activates both stop and program clear.
Press this button to stop play and/or cancel all previous program settings.
When this button is pressed during play, the unit returns to the stop mode.

Stop mode:
In the stop mode, the pickup is at the beginning of the first track and the display shows the total number of tracks and total playing time of the disc. (The disc does not rotate.)

❼ Forward and backward skip/search buttons

These buttons are used for the following four operations.

1. **To program track numbers before starting play (program play).**
   Press either button before starting play.
2. **To start play from a specific track (direct access play).**
   Press either button before starting play.
3. **To skip to the beginning of a specific track (skip play).**
   Press either button momentarily (less than one second) during play or in the pause mode.
   (The number of tracks skipped is the same as the number of times one of these buttons is pressed.)
4. **To move the pickup forward or backward to a desired point (manual search play).**
   Keep either button pressed during play or in the pause mode and release it when the pickup reaches the desired point.
   The pickup moves slowly at first and then rapidly if one of the skip/search buttons is held down for more than about 3 seconds.

Pickup:
The pickup is a laser device that reads the information on the disc surface. The pickup moves across the disc as the disc is played, but it is not visible from outside the cabinet.

❽ Memory/recall button

This button is used for the following three operations.

1. To program track numbers before starting play **(program play)**. (A maximum of 20 selections can be programmed.)
2. To display programmed track numbers during program play **(program confirmation)**.
3. To enter preset editing time into memory.

❾ Time mode select button

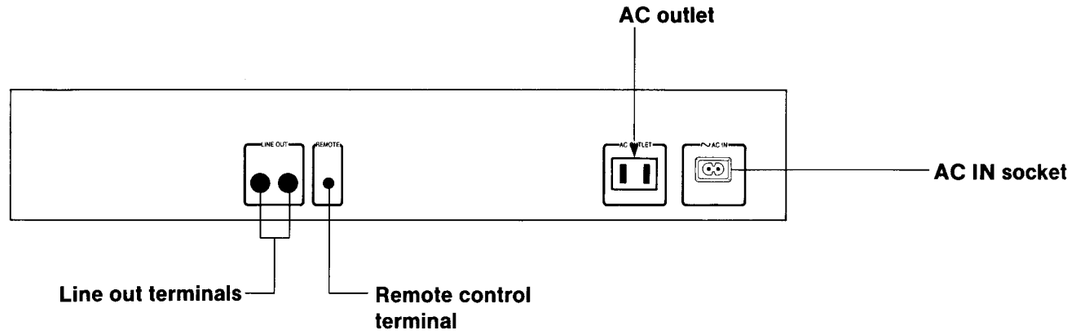
This button is used for the following two operations.

1. To select the time display mode **(time display mode selection)**.
   Each time this button is pressed during play or in the pause mode the time display mode changes.
2. To specify playing time **(preset edit play).**
   Press this button in the stop mode, and then press the forward or backward skip/search button to specify a desired playing time in minutes.
   For program play and repeat play a maximum of 99 minutes can be specified.

❿ Repeat button

This button activates repeat play mode.
Press this button to activate the repeat mode. (The repeat indicator illuminates.)
Press again to cancel the repeat mode.

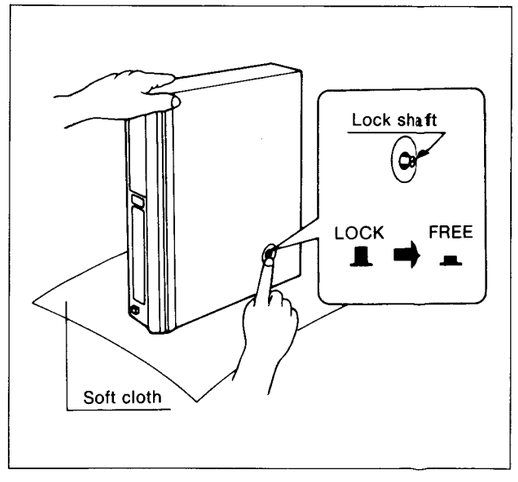
Rear panel



■ BEFORE USING THIS UNIT

NOTE:
IF THE UNIT IS TRANSPORTED AGAIN, PERFORM THE FOLLOWING STEPS:
1) Remove the disc from the holder.
2) Pull the lock shaft to the out (LOCK) position (▬→▮).
CAUTION:
Do not transport the unit without locking the lock shaft.
SEVERE DAMAGE WILL RESULT.

1. Place a soft cloth under the unit to protect it from scratches.
2. Press the lock shaft on the bottom panel to the in (FREE) position (▮→▬).

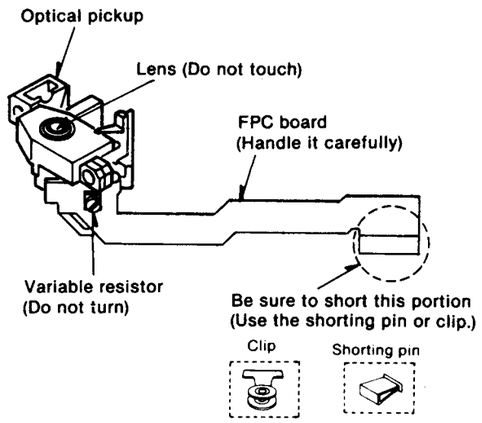


■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

The laser diode in the optical pickup may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the optical pickup.

• Handling of optical pickup

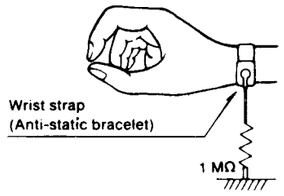
1. Do not give excessive shock to the optical pickup because it is of extremely precise structure.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board. **(FPC board)**
   When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board. **(FPC board)**
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

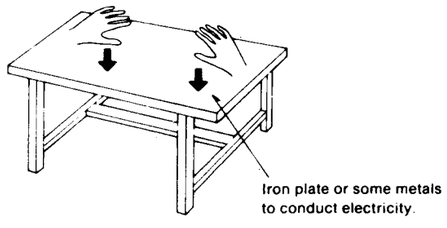


• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to relieve the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.

Caution:
The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the optical pickup.





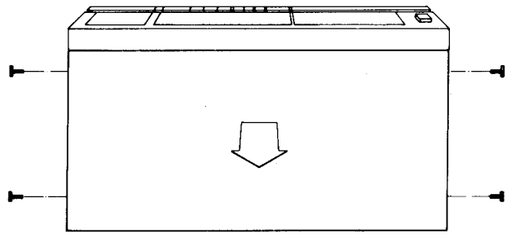
■ DISASSEMBLY INSTRUCTIONS

CAUTION:
- It is very dangerous to look at or touch laser radiation. (Laser radiation is invisible.)
- With the unit turned "on", laser radiation is emitted from the pickup lens.
- When doing the job, removing the cabinet and disc clamper of this unit, be sure to turn the power supply off.

Ref. No. 1 — How to remove the cabinet

Procedure 1

- Remove the 4 screws.

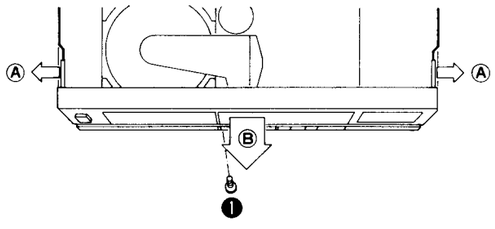


Note: When doing the job, lock the lock shaft at bottom of the unit. (See page 4).

Ref. No. 2 — How to remove the front panel

Procedure 1 ➧ 2

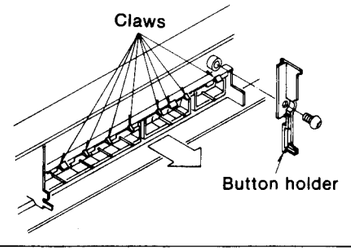
1. Remove the screw ❶.
2. Slightly pull the tabs outward (arrows Ⓐ).
3. Remove in the direction of the arrow Ⓑ.



Ref. No. 3 — How to remove the operation button

Procedure 1 ➧ 2 ➧ 3

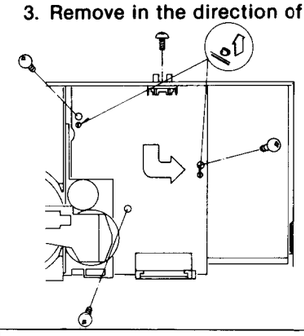
1. Remove the screw and button holder.
2. Release the 8 claws.



Ref. No. 4 — How to remove the main P.C.B.

Procedure 1 ➧ 2 ➧ 4

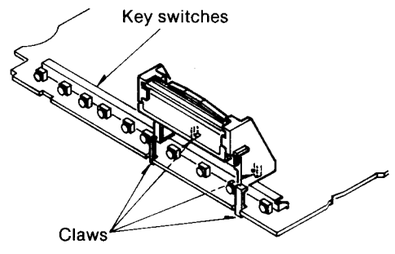
1. Remove the 4 screws.
2. **Lift the P.C.B. to remove it from the chassis tabs.**
3. **Remove in the direction of the arrow.**



Ref. No. 5 — How to remove the F.L

Procedure 1 ➧ 2 ➧ 4 ➧ 5

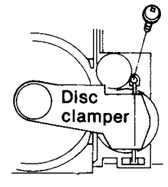
1. Unsolder the terminals of FL.
2. Remove FL from the P.C.B.
3. Release the claws of FL holder and remove the switches.



Ref. No. 6 — How to remove the disc clamper

Procedure 1 ➧ 6

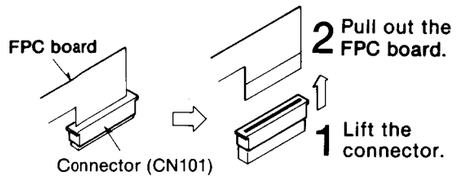
- Remove the screw.



How to check the main P.C.B.

- When checking the soldered surfaces of the main P.C.B. and replacing the parts, do as shown.

1. Remove the main P.C.B.
2. Remove the FPC board (CN101).

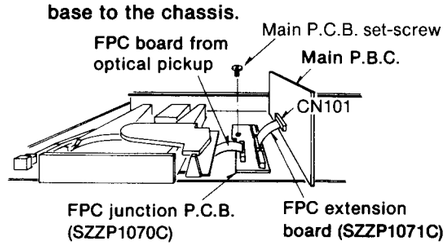


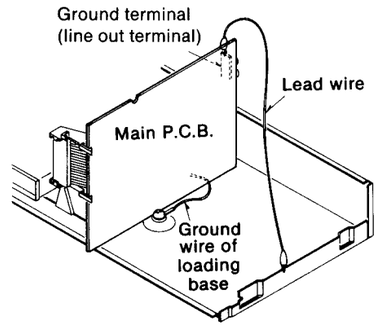
Caution: Insert the short pin into the FPC board in order to prevent breakdown of laser diode. (See page 5)

3. Mount FPC junction P.C.B. (SZZP1070C) on the chassis with the main P.C.B. set-screw as shown in the figure.
4. Connect FPC board from optical pickup to FPC junction P.C.B.
5. Connect FPC extension cord (SZZP1071C) to FPC junction P.C.B. and CN101 of main P.C.B.
6. Place the main P.C.B. as shown in the figure.

Cautions:

1. Be sure to connect the P.C.B. ground terminal (line out terminal) and chassis with a lead wire.
2. Connect the ground wire of loading base to the chassis.

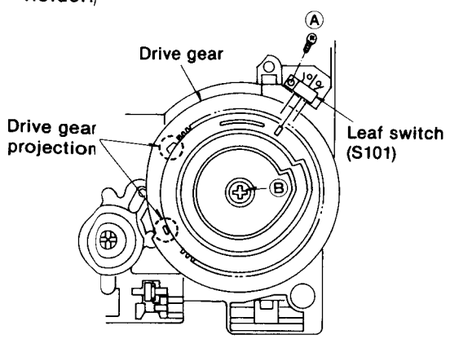




Ref. No. 7 — How to remove the disc holder (disc tray)

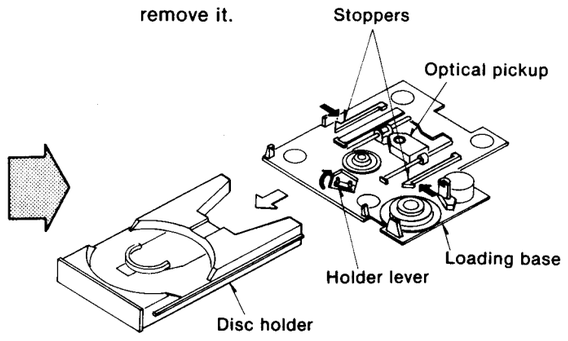
Procedure 1 ➧ 2 ➧ 6 ➧ 7

- Set the drive gear as shown below. (Turn it completely to the right, then turn it to the left by about 20° so that drive gear teeth or projection will not touch the rack of disc holder.)



- **To remove the drive gear**
  Remove the screw Ⓐ of leaf switch (S101), then remove the drive gear setscrew Ⓑ.

1. Push the holder lever backward, (From underneath the loading base.)
2. Pull the disc holder and bend the 2 claws of disc holder stopper of loading base toward the optical pickup.
3. Further pull out the disc holder to remove it.



- **Caution for fitting**
  When fitting the disc holder, make the drive gear as shown on the left, and then insert the disc holder along the guide of loading base. After inserting the disc holder completely, turn the drive gear to the right completely.

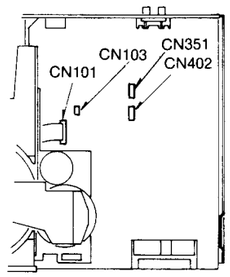
Ref. No. 8 — How to remove the loading base

Procedure 1 ➧ 2 ➧ 8

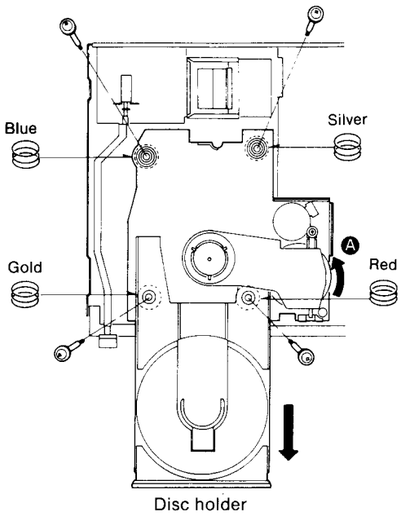
1. Turn the drive gear in the direction of the arrow Ⓐ so that the disc holder comes out.
2. Remove the 4 screws.

Caution: Note the color of each spring, they must be reinstalled to their original positions.

3. Remove the 3 connectors (CN103, CN351, CN402).
4. Remove the FPC board (CN101).



Refer to optical pickup handling precautions (See Page 5).

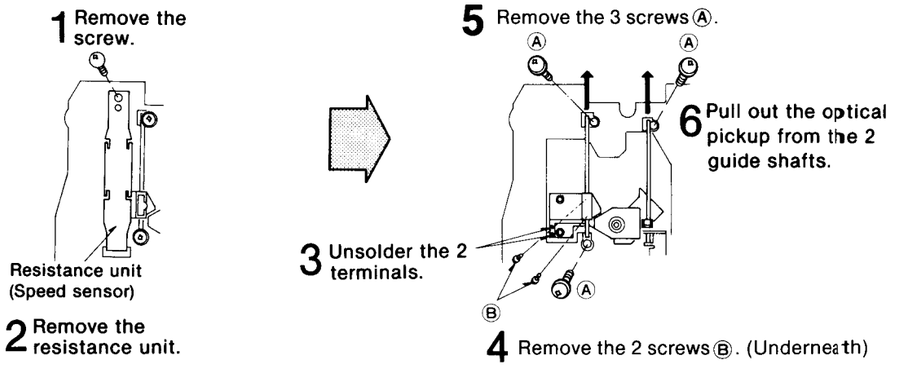


Ref. No. 9 — How to remove the optical pickup

Procedure 7 ➧ 8 ➧ 9

- Follow the numerical order shown.

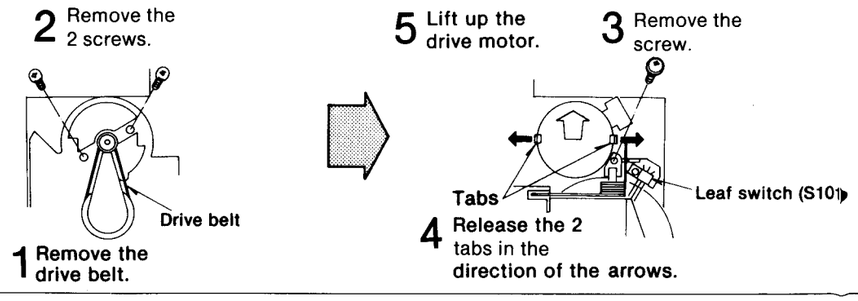
Refer to the optical pickup handling precautions (See page 5).


1 Remove the screw.
Resistance unit (Speed sensor)
2 Remove the resistance unit.
3 Unsolder the 2 terminals.
4 Remove the 2 screws Ⓑ. (Underneath)
5 Remove the 3 screws Ⓐ.
6 Pull out the optical pickup from the 2 guide shafts.

Ref. No. 10 — How to remove the loading motor

Procedure 7 ➧ 8 ➧ 10

- Follow the numerical order shown.


2 Remove the 2 screws.
Drive belt
1 Remove the drive belt.
5 Lift up the drive motor.
3 Remove the screw.
Tabs
Leaf switch (S101)
4 Release the 2 tabs in the direction of the arrows.

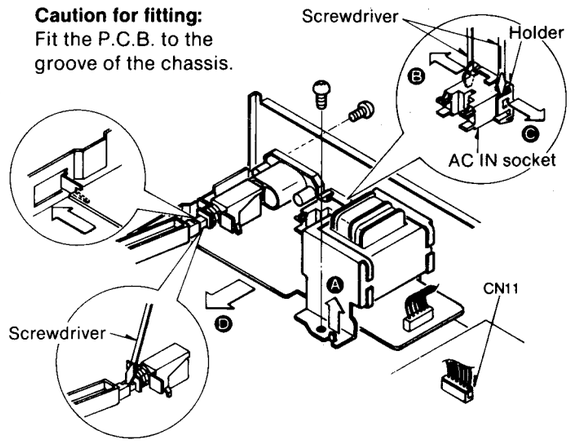
Ref. No. 11	How to remove the power transformer
Procedure 1 ➧ 2 ➧ 8 ➧ 11	

1. Remove the connector (CN11).
2. Remove the 2 screws.
3. Lift the power transformer to remove it from the chassis tab. (arrow Ⓐ)
4. Separate the AC IN socket from the holder by using a screwdriver. (arrow Ⓑ, Ⓒ)
5. Remove the power source P.C.B. in the direction of the arrow Ⓓ.

• How to remove the power switch rod

1. Set the power switch in "OFF" position.
2. Remove the power switch rod by using a screwdriver.

Caution for fitting:
Fit the P.C.B. to the groove of the chassis.



Ref. No. 12	How to remove the spindle motor
Procedure 1 ➧ 2 ➧ 8 ➧ 12	

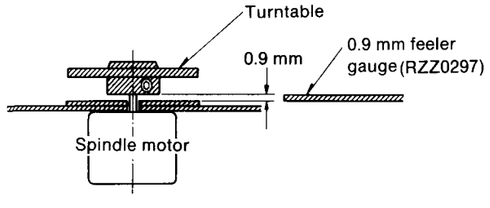
1. Loosen the screw ❶ by using a 1.27 mm hexagonal wrench and remove the turntable.
2. Remove the 2 screws (❷, ❸).

Caution:

1. Turntable height adjustment is necessary any time the turntable or spindle motor is replaced.
2. The (+) terminal of the spindle motor is indicated by the red mark.

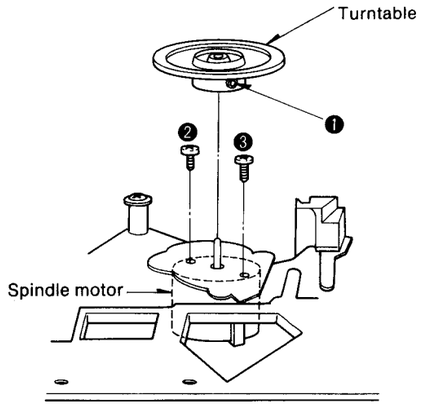
Adjustment of turntable height

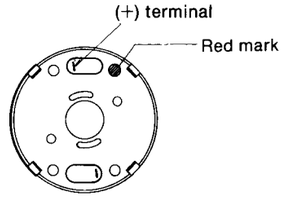
1. Insert a 0.9 mm feeler gauge (RZZ0297) between the turntable and loading base as shown below.



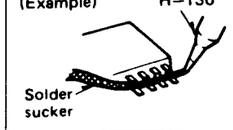
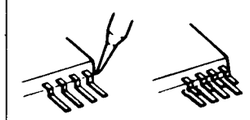
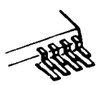
2. Tighten the turntable set-screw by using a 1.27 mm hexagonal wrench.

Caution:
Refer to optical pickup adjustment (see page 16).





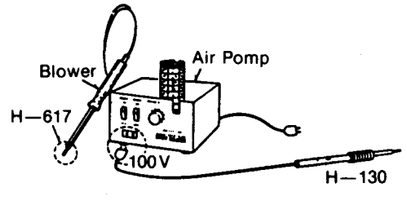
■ HOW TO REPLACE IC'S (Small outline type)

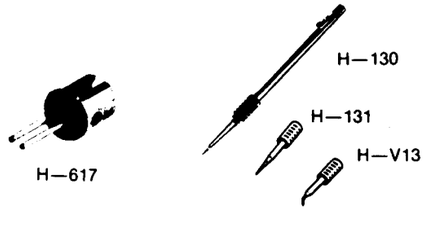
	Replacing procedure		Cautions
1	Reduce the amount of solder on each pin of the integrated circuit by use of a solder sucker.	(Example) H–130 	• Recommended tool .....Special soldering iron * H605M and H-130. * H605E and H-130. • Do not touch the soldering iron to the area for a long time. It may otherwise cause removal of the print foil. • When shifting the pin upward, do the job quickly while the solder is melting. If the solder is hard, it may cause removal or breakage of the print foil. • When using a pencil type soldering iron. 1. Completely remove the solder from each IC pin by use of solder sucker. 2. Raise each pin by means of an eyeleteer, hold the pliers then remove IC package from P.C.B.
2	Melt the solder on the pin (one electrode) with the soldering iron.		
3	While the solder is melting, shift the pin upward by the soldering iron to remove it from the foil.		
4	Remove each pin from the foil according to the above-mentioned procedure.		

*** Special soldering iron**
(Refer to Technical Information, ORDER NO. GAD84125486T1)

• H–605 Spot Heater (hot-air solder iron)
This device that uses hot air to melt solder was developed to remove Flat-Package ICs, RHCs and chip parts.

- H–605M (For 120V power source)
- H–605E (For 200V/220V/240V power source)





• H–617 Twin Nozzle (for spot heater)
Special nozzle for the removal of RHCs and chip resistors. (Nozzle diameter: 1.0mm × 2)

• H–130 Slim Pencil Solder Iron
An ultrasmall ceramic heater solder iron is extremely handy for soldering chip parts, RHCs, ICs etc., to high-density circuit boards.
Features:

• Rated power:	100V, 15W
• Max. temp.:	400°C
• Heater:	ceramic (long life)
• Insulation resistance:	100MΩ
• Length:	178mm
• Weight:	16g (not including cord)

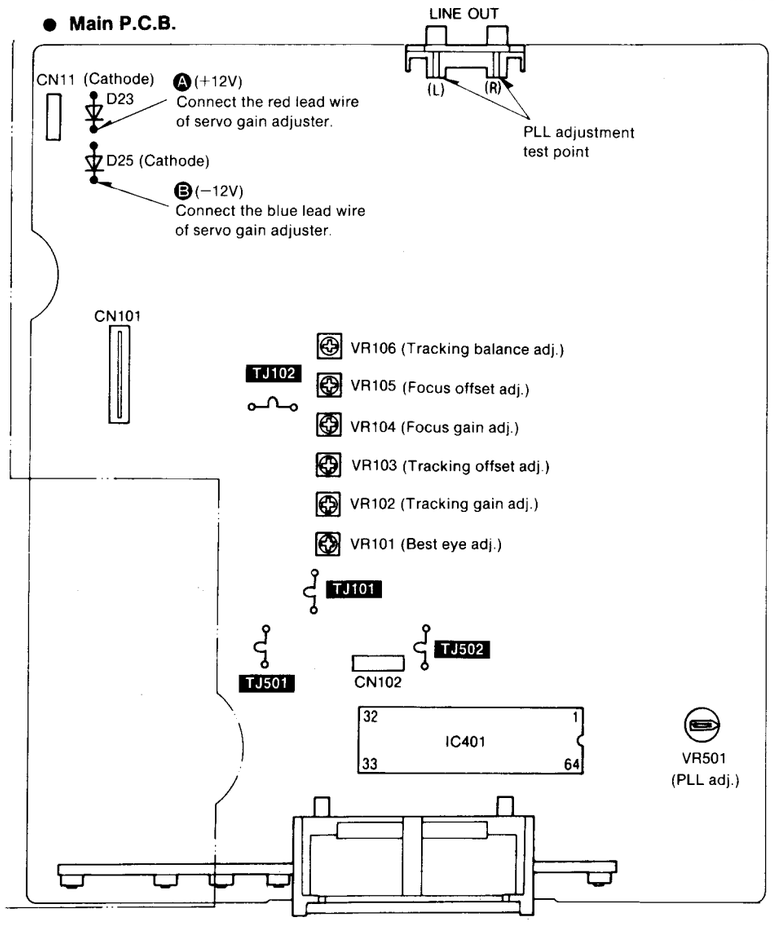
• H–131, H–V13 Cap Bits
Solder tip for the slim pencil Solder Iron is composed of a bit holder and a corrosion resistance solder tip.
Permits changing of solder tips even while still hot.

• Solder tip:	0.3mm

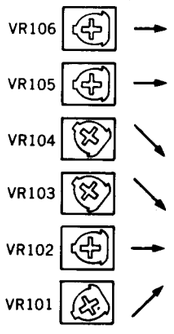
■ MEASUREMENTS AND ADJUSTMENTS

Caution:
- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.)
  With the unit turned "on", laser radiation is emitted from the pickup lens.
  Avoid exposure to the laser beam , especially when performing adjustments.

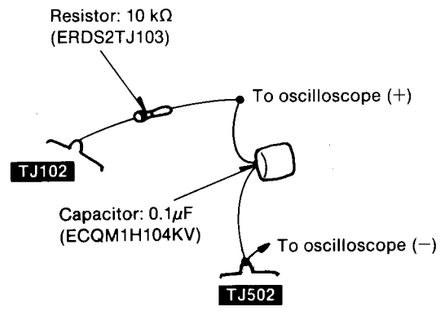
ADJUSTMENT POINTS



•Temporary Setting of Each VR



•Filter for focus offset (1)



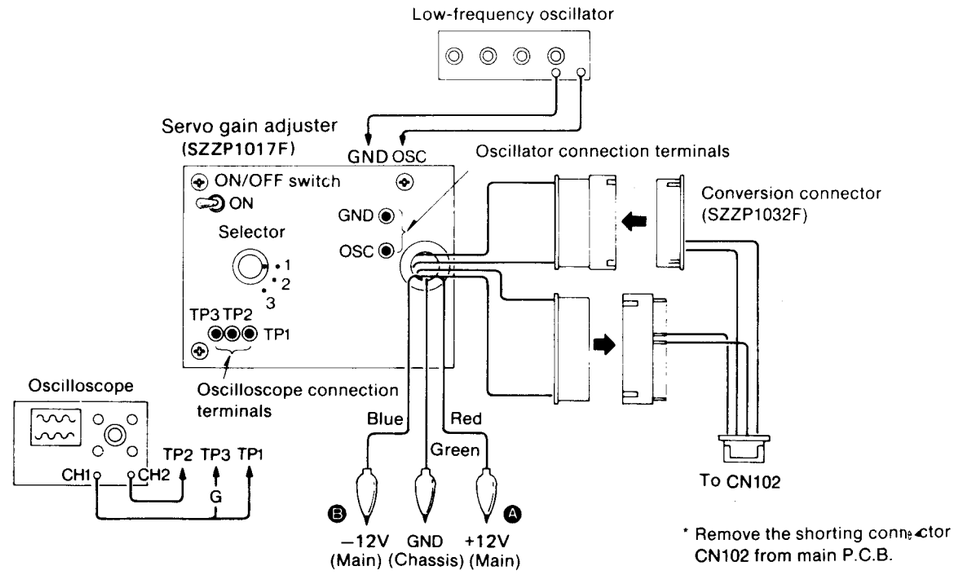
ELECTRICAL ADJUSTMENT

Measuring Instruments and Special Tools
- Servo gain adjuster (SZZP1017F)
- Test discs
  Test disc(SZZP1014F) old or new type
  Inspection test disc (SZZP1054C)
  Uneven disc (SZZP1056C)
  Black band disc (SZZP1057C)
- Ordinary disc
- Two-channel oscilloscope (with trigger) of 30MHz or over
- Low frequency oscillator
- Conversion connector(SZZP1032F)

Adjustment Procedure

Step 1: Remove the cabinet. (Refer to page 6.)
↓
Step 2: Make the temporary setting of each VR . (Refer to page 11.)
↓
Step 3: Temporary adjustment of focus and tracking offset.(Refer to page 13.)
↓
Step 4: Focus offset(1) adjustment. (Refer to page 13.)
↓
Step 5: Best eye (PD balance) adjustment. (Refer to page 13.)
↓
Step 6: Connect the servo gain adjuster. (Refer to page 12.)
↓
Step 7: Focus gain adjustment. (Refer to page 13.)
↓
Step 8: Tracking gain adjustment. (Refer to page 14.)
↓
Step 9: Focus offset (2) adjustment. (Refer to page 14.)
↓
Step 10: Tracking offset adjustment. (Refer to page 14.)
↓
Step 11: Connect the servo gain adjuster. (Refer to page 12.)
↓
Step 12: Tracking offset balance adjustment.(Refer to page 15.)
↓
Step 13:PLL adjustment. (Refer to page 15.)
↓
Step 14: Check of operation after adjustment.(Refer to page 15.)

Connection of Servo Gain Adjuster



TEMPORARY ADJUSTMENT OF FOCUS AND TRACKING OFFSET

(Temporary adjustment of focus offset)

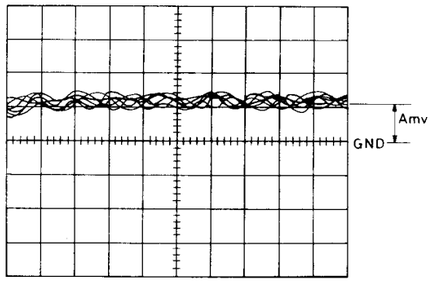
1.Connect CH1 of the oscilloscope to **TJ102** (+) and **TJ502** (-) of the main P.C.B.
Oscilloscope setting:VOLT.....100mV
SWEEP.....5msec.
INPUT.....DC
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3.After the player read TOC, adjust **VR105** so that the voltage waveform center on the oscilloscope is **0mV.**

(Temporary adjutment of tracking offset)

1.Connect CH1 of the oscilloscope to **TJ101** (+) and **TJ502** (-) of the main P.C.B.
Oscilloscope setting:VOLT.....100mV
SWEEP.....5msec.
INPUT.....DC
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3.After the player read TOC, adjust **VR103** so that the voltage waveform center on the oscilloscope is **0mV.**

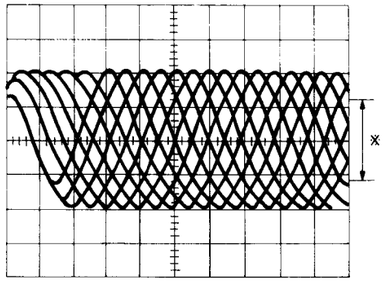
FOCUS OFFSET(1) ADJUSTMENT

1.Connect CH1 of the oscilloscope to **TJ102** (+) and **TJ502** (-) of the main P.C.B.through the filter.(Refer to page 11.)
Oscilloscope setting:VOLT.....50mV
SWEEP.....5msec.
INPUT.....DC
2.Set the oscilloscope to DC zero balance.
3.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
4.Set the player to the play mode.
5.Measure the DC level(AmV) displayed on the oscilloscope.
6.After measuring , set the player to the stop mode.
7.Adjust **VR105** so that the voltage is **AmV±10mV.**



BEST EYE(PD BALANCE) ADJUSTMENT

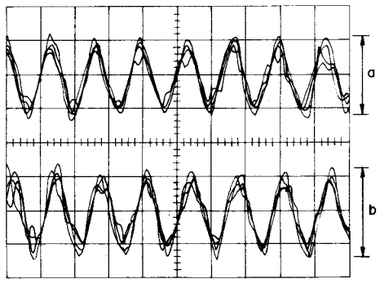
1.Connect CH1 of the oscilloscope to **TJ501** (+) and **TJ502** (-) of the main P.C.B.
Oscilloscope setting:VOLT.....200mV
SWEEP.....0.5μsec.
INPUT.....AC
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
3.Set the player to the play mode.
4.Adjust **VR101** so that the eye pattern of RF signal is stretched to maximum.
5.Turn **OFF** the power switch of the player.



*Most stretched eye pattern

FOCUS GAIN ADJUSTMENT

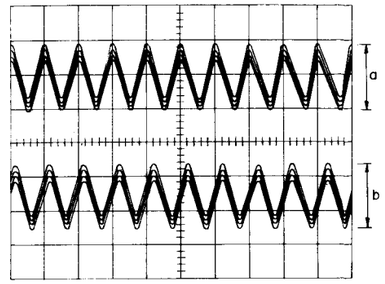
1.Connect the servo gain adjuster.(Refer to page 12.)
2.Set the selector switch of the servo gain adjuster to **2** and ON-OFF switch to **ON.**
3.Set the low frequency oscillator to a frequency of **750Hz** and an output voltage of **100mVp-p.** Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.
4.Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster.(TP3 is the ground terminal.)
Oscilloscope setting:VOLT.....200mV(both channels)
SWEEP.....1msec.
INPUT.....DC
5.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
6.Set the player to the play mode.
7.Set the selector switch of the servo gain adjuster from **"2"** to **"3"**.
8.**750Hz** signals will be displayed on the oscilloscope. Adjust **VR104** until the waveform amplitudes of both channels are equal.
9.Shift the selector switch of the servo gain adjuster from **"3"** to **"2"**.
10.Turn **OFF** the power switch of the player.



* Make a=b

TRACKING GAIN ADJUSTMENT

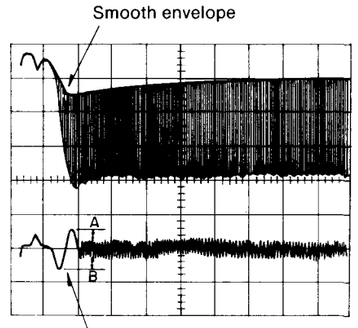
1.Set the low frequency oscillator to a frequency of **1.0kHz** and an output voltage of **100mVp-p.** Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.
2.Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster.(TP3 is the ground terminal.)
Oscilloscope setting:VOLT.....200mV(both channels)
SWEEP.....1msec.
INPUT.....DC
3.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
4.Set the player to the play mode.
5.Set the selector switch of the servo gain adjuster from **"2"** to **"1"**.
6.**1.0kHz** signals will be displayed on the oscilloscope. Adjust **VR102** until the waveform amplitudes of both channels are equal.
7.Shift the selector switch of the servo gain adjuster from **"1"** to **"2"**.
8.Turn **OFF** the power switch of the player.
9.Disconect the servo gain adjuster,and insert the shorting connector of CN102 to the original position.



*Make a=b

FOCUS OFFSET(2) ADJUSTMENT

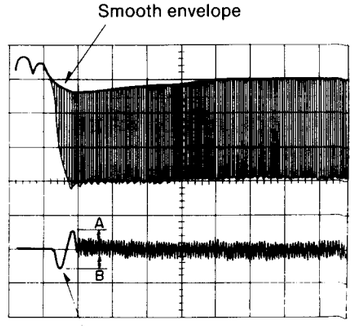
1.Connect CH1 of the oscilloscope to **TJ501** (+) and **TJ502** (-) of the main P.C.B. Connect CH2 of the oscilloscope to **TJ102** (+) and **TJ502** (-)of the main P.C.B.
Oscilloscope setting:VOLT.....200mV(both channels)
SWEEP.....0.5msec.
INPUT.....AC(CH1), DC(CH2)
MODE.....NORM
(Triggering via CH1)
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3.Set the player to the play mode.
4.Check the waveform of CH1 and CH2 on the oscilloscope and adjust **VR105**, so that the waveform around the triggering point becomes as shown in the illustration.



Minimize the amplitude
or make A=B

TRACKING OFFSET ADJUSTMENT

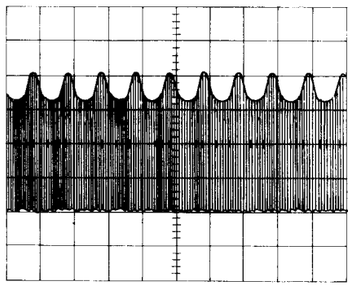
1.Connect CH1 of the oscilloscope to **TJ501** (+) and **TJ502** (-) of the main P.C.B. Connect CH2 of the oscilloscope to **TJ101** (+) and **TJ502** (-)of the main P.C.B.
Oscilloscope setting:VOLT.....200mV(both channels)
SWEEP.....0.5msec.
INPUT.....AC(CH1), DC(CH2)
MODE.....NORM
(Triggering via CH1)
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3.Set the player to the play mode.
4.Check the waveform of CH1 and CH2 on the oscilloscope and adjust **VR103**, so that the waveform around the triggering point becomes as shown in the illustration.



Minimize the amplitude
or make A=B

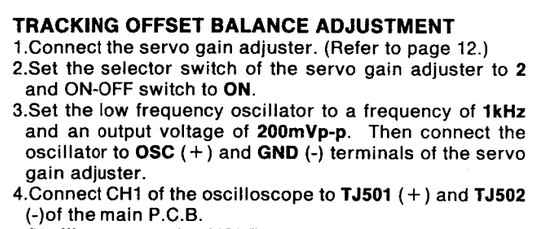
TRACKING OFFSET BALANCE ADJUSTMENT

1.Connect the servo gain adjuster. (Refer to page 12.)
2.Set the selector switch of the servo gain adjuster to **2** and ON-OFF switch to **ON**.
3.Set the low frequency oscillator to a frequency of **1kHz** and an output voltage of **200mVp-p**. Then connect the oscillator to **OSC** (+) and **GND** (-) terminals of the servo gain adjuster.
4.Connect CH1 of the oscilloscope to **TJ501** (+) and **TJ502** (-)of the main P.C.B.
Oscilloscope setting:VOLT.....200mV
SWEEP.....0.5msec.
INPUT.....AC
5.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
6.Set the player to the play mode.
7.Set the selector switch of the servo gain adjuster from **"2"** to **"1"**.
8.Adjust **VR106** so that the output waveform is as shown (jitter is minimized).
9.Shift the selector switch of the servo gain adjuster from **"1"** to **"2"**.
10.Turn **OFF** the power switch of the player.
11.Disconnect the servo gain adjuster, and insert the shorting connector of CN102 to the original position.

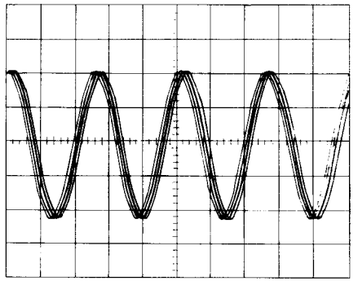


PLL ADJUSMENT

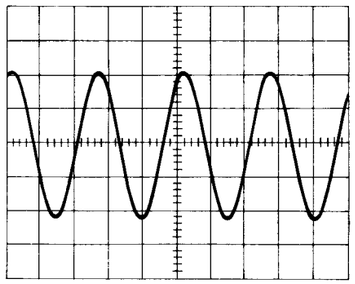
1.Connect CH1 of the oscilloscope to the **LINE OUT terminal** (either of Lch or Rch) and **ground.**
Oscilloscope setting:VOLT.....1V
SWEEP.....1msec.
INPUT.....DC
2.Turn **ON** the power switch of the player and insert the test disc(SZZP1054C).
3.Play **Track No.6 (wedge 0.7mm)** of the test disc.
4.Check the waveform displayed on the oscilloscope and adjust **VR501** in the following steps.
Step 1. Turn **VR501** clockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.
Step 2. Turn **VR501** counterclockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.
Step 3. Set **VR501** in the middle between the points observed in the above steps "1" and "2".


Noise started to appear in output sound with VR501 turned counterclockwise.
2
Final setting point.
1
Noise started to appear in output sound with VR501 turned clockwise.

•NG



•OK



CHECK OF PLAY OPERATION AFTER ADJUSTMENT

Check of skip search
1.Play an ordinary disc.
2.Press the skip button and verify skip search operation (forward and reverse).

Check of manual search
1.Play an ordinary disc.
2.Press the manual search button and verify that smooth manual search can be performed at low and high speeds (forward and reverse).

Check of playability
1.Play the test disc (SZZP1054C).
2.Play the track No.6 (wedge 0.7mm) and verify that there is no skip sound or noise.
3.Play the track No.13 (black dot 0.7mm) and verify that there is no skip sound or noise.

OPTICAL PICKUP ADJUSTMENT

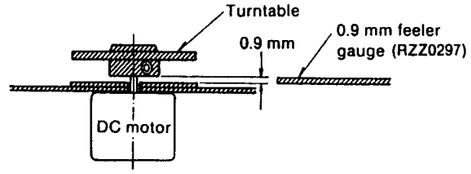
Measuring Instruments and Special Tools
- Two-channel oscilloscope (with trigger) of 30MHz or over
- Test discs
  Test disc (SZZP1014F) old or new type
  Inspection test disc (SZZP1054C)
  Uneven disc (SZZP1056C)
- Hexagonal wrench (SZZP1044C...1.5mm)
- Hexagonal wrench (1.27mm)
- Screw lock paint (RZZ0L01)

Adjustment Procedure
- If the optical pickup and spindle motor are replaced, adjust it according to the following procedure.

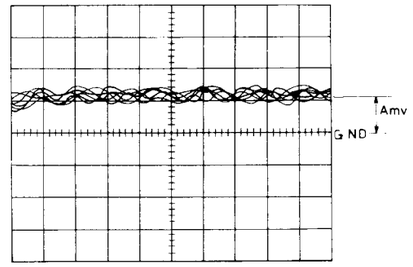
Step 1: Make the temporary of each VR.(Refer to page 11.)
Step 2: Turetable height adjustment. (Refer to page 16.)
Step 3: Machanical adjustment. (Refer to page 16.)
Step 4: Electrical adjustment. (Refer to page 12.)

TURNTABLE HEIGHT ADJUSTMENT

1.Insert the 0.9mm feeler gauge(RZZ0297) between the turntable and the loading base as shown below.

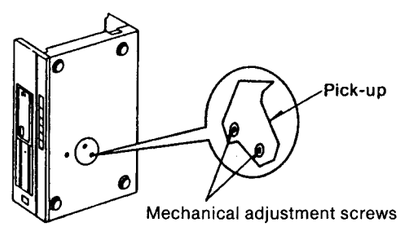


2.Tighten the turntable set-screw by using a 1.27mm hexagonal wrench.
3.Temporary adjustment of focus adjustment.(Refer to page 13.)
4.Connect CH1 of the oscilloscope to **TJ102** (+) and **TJ502** (-) of the main P.C.B.through the filter.(Refer to page 11.)
Oscilloscope setting:VOLT.....50mV
SWEEP.....1msec.
INPUT.....DC
5.Set the oscilloscope to DC zero balance.
6.Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
7.Set the player to the play mode.
8.Measure the DC level (AmV) displayed on the oscilloscope.
9.After measuring, set the player to the stop mode.
10.Adjust **VR105** so that the voltage is **AmV ± 10mV.**

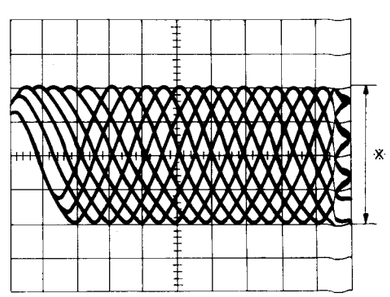


MECHANICAL ADJUSTMENT

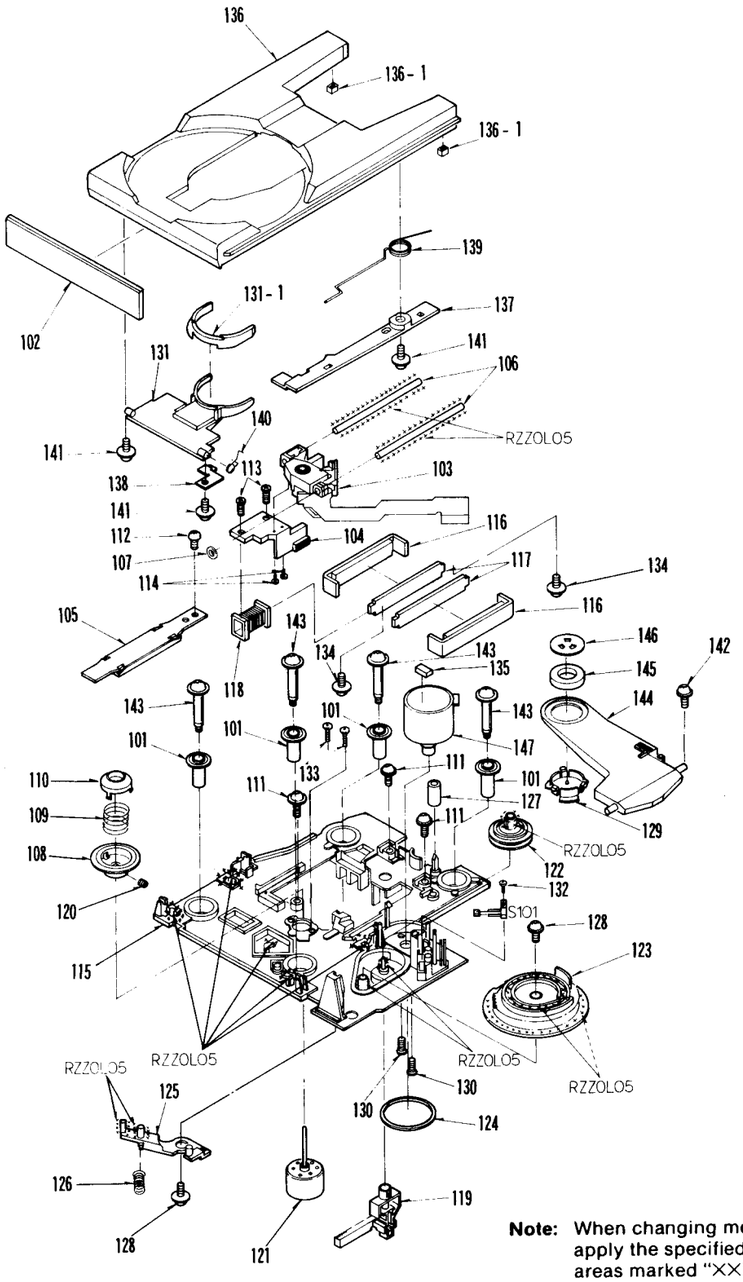
1.Connect CH1 of the oscilloscope to **TJ501** (+) and **TJ502** (-) of the main P.C.B.
Oscilloscope setting:VOLT.....200mV
SWEEP.....0.5μsec.
INPUT.....AC
2.Turn **ON** the power switch of the player and insert the test disc (SZZP1056C).
3.Play track No.9 of the test disc.
4.Monitoring RF signal on the oscilloscope, adjust **the two adjusting screws** alternatelywith the 1.5mm hexagonal wrench (SZZP1044C) so that the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.
5.Turn **OFF** the power switch of the player.
6.After the adjustment, apply **screw lock pain(RZZ0L01)** to the adjusting screws.

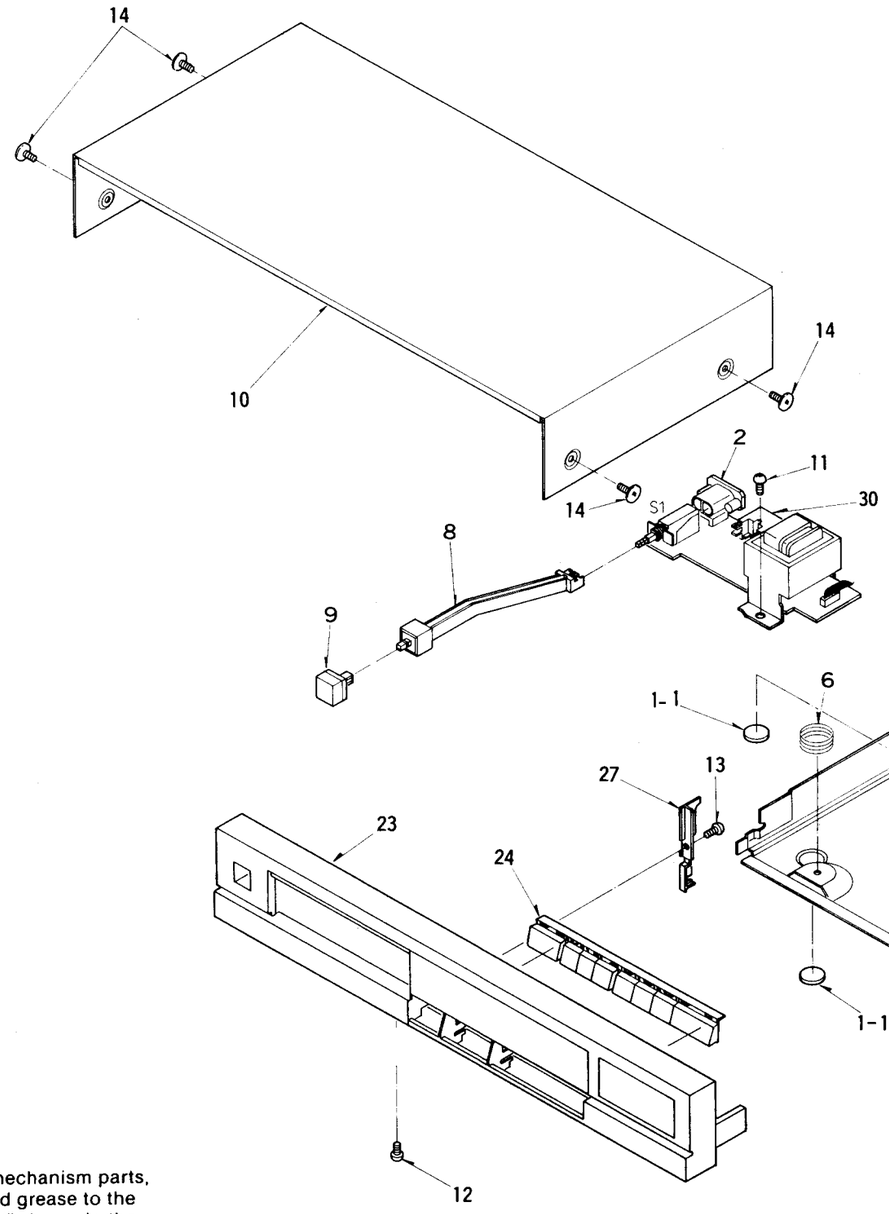


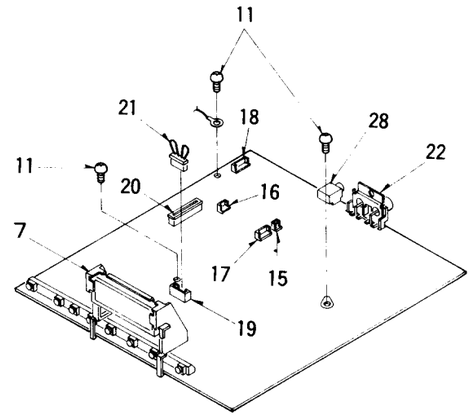
Note: The mechanical adjustment screws have been already locked with screw lock paint at the factory. It might be hard to turn them.

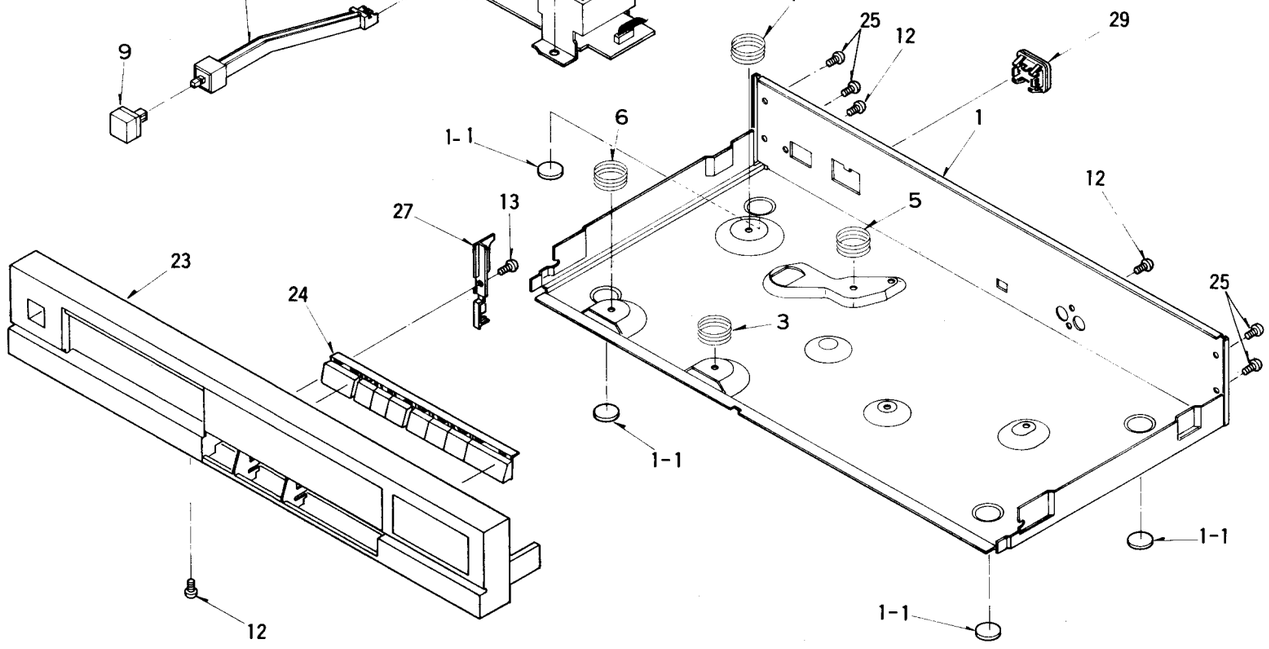


■ EXPLODED VIEW









Note: When changing mechanism parts, apply the specified grease to the areas marked "XX" shown in the drawing.

101~115	102 110 109 108 105 115 112 107 114 101 113 101 111 118 101 104 103 111 111 106 101
116~130	116 117 127 116 129 118 123 120 126 125 128 121 130 130 119 124 122 128
131~147	141 138 141 143 131 136 131-1 140 143 134 133 136-1 139 136-1 143 141 137 135 143 147 132 146 134 145 144 142

1~30	10 9 8 1-1 2 6 1-1 7 4 3 5 1 1-1 14 12 14 13 14 11 11 25 12 17 11 18 19 16 15 12 23 24 27 30 21 20 28 29 25 22

■ REPLACEMENT PARTS LIST

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Code	Description
INTEGRATED CIRCUITS			
IC13	M5236L	001 060 5358 9	I.C., REGULATOR
IC101	AN8370S	001 060 8399 8	I.C., SERVO
IC102	MN6636S	001 061 3044 7	I.C., ANALOG SW.
IC103, IC104	AN6554NS	001 060 4860 4	I.C., OPERATION AMP.
IC301	MN6617	001 060 8411 9	I.C., SIGNAL PROCESSING
IC302	MN6618A	001 061 3043 8	I.C., DIGITAL FILTER
IC303	SVICXK5816M	001 061 3298 7	I.C., 16K RAM
IC351	AN6552S	001 060 7386 7	I.C., OPERATION AMP.
IC401	MN15261PDU	001 061 3086 7	I.C., SYSTEM CONTROL
IC402	AN6552S	001 060 7386 7	I.C., OPERATION AMP.
IC403	MN1280-R	001 060 8669 5	I.C., RESET
IC404	MN1550PDT	001 061 3639 6	I.C., MICRO COMPUTER
IC501	AN8371S	001 060 8400 2	I.C., PLL
IC801	SVIPCM55HP-2	001 061 4892 1	I.C., D/A CONVERTER
IC802	MN6636S	001 061 3044 7	I.C., ANALOG SW.
IC803	SVILM833M	001 061 4829 8	I.C., OPERATION AMP.
IC804	SVIBA4560F	001 061 4890 3	I.C., OPERATION AMP.
IC805, IC806	SVIGA011	001 061 3045 6	I.C., FILTER
IC807	MN1280-S	001 061 3084 9	I.C., MUTING
TRANSISTORS			
Q11	2SD1862QR	001 030 7210 8	TRANSISTOR
Q12, Q13	2SB793A-QRS	001 030 2370 3	TRANSISTOR
Q14	2SB793A-QRS	001 030 2370 3	TRANSISTOR
Q15	2SD973A-QRS	001 030 1947 8	TRANSISTOR
Q16	2SB793A-QRS	001 030 2370 3	TRANSISTOR
Q17	2SB642-QRS	001 030 2556 5	TRANSISTOR
Q101	2SD637	001 030 1794 7	TRANSISTOR
Q141	2SD973A-QRS	001 030 1947 8	TRANSISTOR
Q142	2SB793A-QRS	001 030 2370 3	TRANSISTOR
Q161	2SD973A-QRS	001 030 1947 8	TRANSISTOR
Q162	2SB793A-QRS	001 030 2370 3	TRANSISTOR
Q181	2SD973A-QRS	001 030 1947 8	TRANSISTOR
Q182	2SB793A-QRS	001 030 2370 3	TRANSISTOR
Q351	UN4112	001 030 3018 2	TRANSISTOR
Q354	2SD973A-QRS	001 030 1947 8	TRANSISTOR
Q355	2SB793A-QRS	001 030 2370 3	TRANSISTOR
Q402	2SD973A-QRS	001 030 1947 8	TRANSISTOR
Q403	2SB793A-QRS	001 030 2370 3	TRANSISTOR
Q408	UN4112	001 030 3018 2	TRANSISTOR
Q409	UN4212	001 030 3019 1	TRANSISTOR
Q801, Q802	2SC3311A-Q	001 030 5279 5	TRANSISTOR
Q803, Q804	2SD1330R	001 030 2521 6	TRANSISTOR
Q805	UN4112	001 030 3018 2	TRANSISTOR
Q806	UN4212	001 030 3019 1	TRANSISTOR
Q807	UN4112	001 030 3018 2	TRANSISTOR
Q808	UN4212	001 030 3019 1	TRANSISTOR
DIODES			
D11, D12	MA4091-M	001 032 7213 5	DIODE
D15, D16	MA4068M	001 032 4954 7	DIODE
D17	MA4330L	001 032 7228 8	DIODE
D18	MA4056-M	001 032 7209 1	DIODE
D19- D26 ⚠	SVD1SR35200A	001 032 3951 4	RECTIFIER
D181, D182	MA165	001 032 0494 0	DIODE
D401- D404	MA165	001 032 0494 0	DIODE
D406, D407	MA165	001 032 0494 0	DIODE
D412, D413	MA165	001 032 0494 0	DIODE
D415- D418	MA165	001 032 0494 0	DIODE
D422, D423	MA165	001 032 0494 0	DIODE
D801- D807	MA165	001 032 0494 0	DIODE
D809, D810	MA165	001 032 0494 0	DIODE
I.C.PROTECTORS			
ICP11, ICP12	SRUN15	001 061 2834 9	I.C.PROTECTOR, 1.5 A
VARIABLE RESISTORS			
VR101	EVND3AA00B53	001 180 2644 9	V.R., 5KΩ(B)
VR102, VR103	EVND3AA00B14	001 180 2642 1	V.R., 10KΩ(B)
VR104, VR105	EVND3AA00B14	001 180 2642 1	V.R., 10KΩ(B)
VR106	EVND3AA00B53	001 180 2644 9	V.R., 5KΩ(B)
VR501	EVN38CA00B13	001 180 0549 5	V.R., 1KΩ(B)
COILS AND TRANSFORMERS			
L301	ELEY100KA	001 210 7162 7	COIL
L302	ELEY3R3KA	001 211 3807 4	COIL
T1 ⚠	SLTD5K027SC	001 202 8858 4	POWER TRANSFORMER
OSCILLATORS			
X301	SVQ16CKSS	001 250 1471 7	16.9344MHZ
DISPLAYS			
FL401	SADD9	001 001 0513 7	DISPLAY
SWITCHES			
S1 ⚠	ESB8249V	003 435 5877 0	POWER SWITCH
S101	SSPD5	003 434 1032 8	SW, REST
S401- S408	SSGD1-2	003 437 0912 4	SW, OPERATION
CABINET AND CHASSIS			
1	SGPLP3500-KM	016 840 7692 7	CHASSIS
(M)			
1	SGPLP3500KMC	016 840 7691 8	CHASSIS
(MC)			
1-1	SRGA008N01	016 653 0916 1	RUBBER CUSHION
2 ⚠	SJSD16	003 400 7436 6	AC SOCKET
3	SUSD82	016 726 0999 8	SPRING (RED)
4	SUSD81	016 726 0998 9	SPRING (BLUE)
5	SUSD42	016 726 0841 9	SPRING (SILVER)
6	SUSD43	016 726 0842 8	SPRING (GOLD)
7	SMND7-1	016 631 0050 8	HOLDER
8	SUBD5-M	016 712 0334 9	ROD
9	SBC666	016 702 5545 6	BUTTON
10	SKCD40KY	016 800 2917 3	CABINET
11	XTV3+8J	005 501 0901 2	SCREW
12	XTV3+8JFZ	005 501 0919 2	SCREW
13	XTV3+8G	005 501 0913 8	SCREW
14	SNE2129-1	005 500 7938 6	SCREW
15	EMCS0250Z	003 402 1223 1	CONNECTOR (CN351)
16	EMCS0350Z	003 402 1227 7	CONNECTOR (CN103)
17	EMCS0550Z	003 402 1233 9	CONNECTOR (CN402)
18	EMCS0650Z	003 402 1235 7	CONNECTOR (CN11)
19	EMCS0552M	003 402 0112 1	CONNECTOR (CN102)
20	SJSD1709	003 403 6503 1	CONNECTOR (CN101)
21	SRDJ001N14E	003 410 6157 8	SHORTING PIN (CN102)
22	SJFD4	003 410 7707 6	OUTPUT TERMINAL
23	SGYLP3500-KM	016 840 7687 4	FRONT PANEL
24	SBCD311MA	016 702 7094 4	BUTTON
25	XTV3+8FFZ		SCREW
27	SHRD22-M	016 650 5257 8	BRACKET
28	SJJ130-2	003 400 7317 2	JACK, REMOTE
29	SJS9331A	003 403 7236 7	AC OUTLET COVER
30 ⚠	SJS9331B	003 403 7275 0	AC OUTLET

Ref. No.	Part No.	Part Code	Description
LOADING MECHANICAL			
101	SHGD95-1	016 653 1136 7	RUBBER CUSHION
102	SGXD180ZK0Y		ORNAMENT PLATE
103 ⚠	SOALP1200-KM	001 271 0692 3	OPTICAL PICKUP ASS'Y
104	EWSL04A00000	016 631 0044 6	HOLDER
105	EWS7B0A00Q53	001 174 8773 3	RESISTANCE UNIT
106	SUXD25	016 634 0124 2	SHAFT
107	SHGD47	016 653 1070 8	SPACER
108	SD0D28-E	016 766 0225 3	TURNTABLE
109	SRQA010N04	017 726 0412 8	SPRING
110	SD0D29	005 512 0855 0	RING
111	SNSD10	005 500 5675 8	SCREW
112	XTV3+8G	005 501 0913 8	SCREW
113	XTN2+4G	005 501 2780 5	SCREW
114	XQN17+A6	005 500 4900 2	SCREW
115	SISD12	016 630 1828 3	LOADING BASE
116	S0YD8E	016 634 0128 8	YOKE
117	S0YD9	016 634 0125 1	YOKE
118	S0RD10E	001 211 3219 8	COIL
119	SHRD23	016 652 0633 4	LOCK SHAFT
120	XXE26D5	005 500 5095 2	SCREW
121	SJGDRF310T	002 310 2552 2	MOTOR
122	SDGD19	016 745 0199 5	GEAR
123	SDGD20-1	016 745 0202 7	GEAR
124	SMBD2-1	016 754 0059 5	BELT
125	SHRD19	016 652 0634 3	LEVER
126	SUSD31	016 726 0843 7	SPRING
127	SHGD69	016 653 1078 0	RUBBER
128	SNSD10	005 500 5675 8	SCREW
129	SIRD51	016 652 0849 0	HOLDER
130	XSN26+6	005 500 1364 6	SCREW
131	SIRLP117-KM1	016 652 0847 2	DISC HOLDER
131-1	SHGD107	016 653 1194 7	RUBBER CUSHION
132	XTN2+5G	005 501 3534 3	SCREW
133	XYM2+C12	005 503 1322 1	SCREW
134	SFXGQ06N01	005 500 4983 3	SCREW
135	SHGD116	016 653 1188 5	RUBBER CUSHION
136	SIRLP117-KM	016 631 0060 6	DISC TRAY
136-1	SHGD49	016 653 1079 9	RUBBER CUSHION
137	SIRD20	016 718 3355 2	LEVER
138	SUWD46	016 650 5256 9	BRACKET
139	SUSD29-1	016 726 0845 5	SPRING
140	SUSD51	016 726 0846 4	SPRING
141	SNSD10	005 500 5675 8	SCREW
142	SFXGQ06N01	005 500 4983 3	SCREW
143	SHDD1-5	016 652 0759 1	SCREW
144	SIRD17-2E	016 652 0848 1	CLAMPER
145	S0MD4	003 453 0241 8	MAGNET
146	S0YD2	016 634 0111 7	YOKE
147	SJGD8E	002 310 2569 3	MOTOR

Ref. No.	Part No.	Part Code	Description
PACKINGS			
P1 (M)	SPND205		CARTON BOX
P1 (MC)	SPND206		CARTON BOX
P2	SPSD122	016 977 3311 9	PAD
P3	SPSD123	016 977 3312 8	PAD
P4	XZB55X40A01	016 978 0472 0	PROTECTION BAG
P5	SPSD68	016 977 3081 4	SHEET
P6	XZB26X17C03	016 978 0526 3	POLYETHYLENE BAG
P7	SFYH18X17	017 978 0057 3	PROTECTION COVER
P8	SPSD25	016 977 2874 3	SHEET
ACCESSORIES			
A1 (M)	SQUD219	016 983 5173 7	INSTRUCTION MANUAL
A1 (MC)	SQULP3500KMC		INSTRUCTION MANUAL
A2 (MC) ⚠	SJA172	003 490 4069 7	POWER CORD
A2 (M) ⚠	SJA175-1T	003 490 5406 6	POWER CORD
A3	SJP2249-1	003 492 6446 4	OUTPUT CORD
A4	SJP2257	003 492 4915 4	CORD, SYNCHRO-REC
A5	SRNL007N01	017 862 0166 2	BRACKET
A6	SRGA008N01	016 653 0916 1	RUBBER CUSHION

■ RESISTORS AND CAPACITORS

Notes: * Important safety notice:
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* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	102
Type	Wattage	Shape	Tolerance	Value

ERX	2	AN	J	471
Type	Wattage	Shape	Tolerance	Value 47x10¹ (ohm)

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	330
Type	Voltage	Peculiarity	Value (33x10° microfarad)

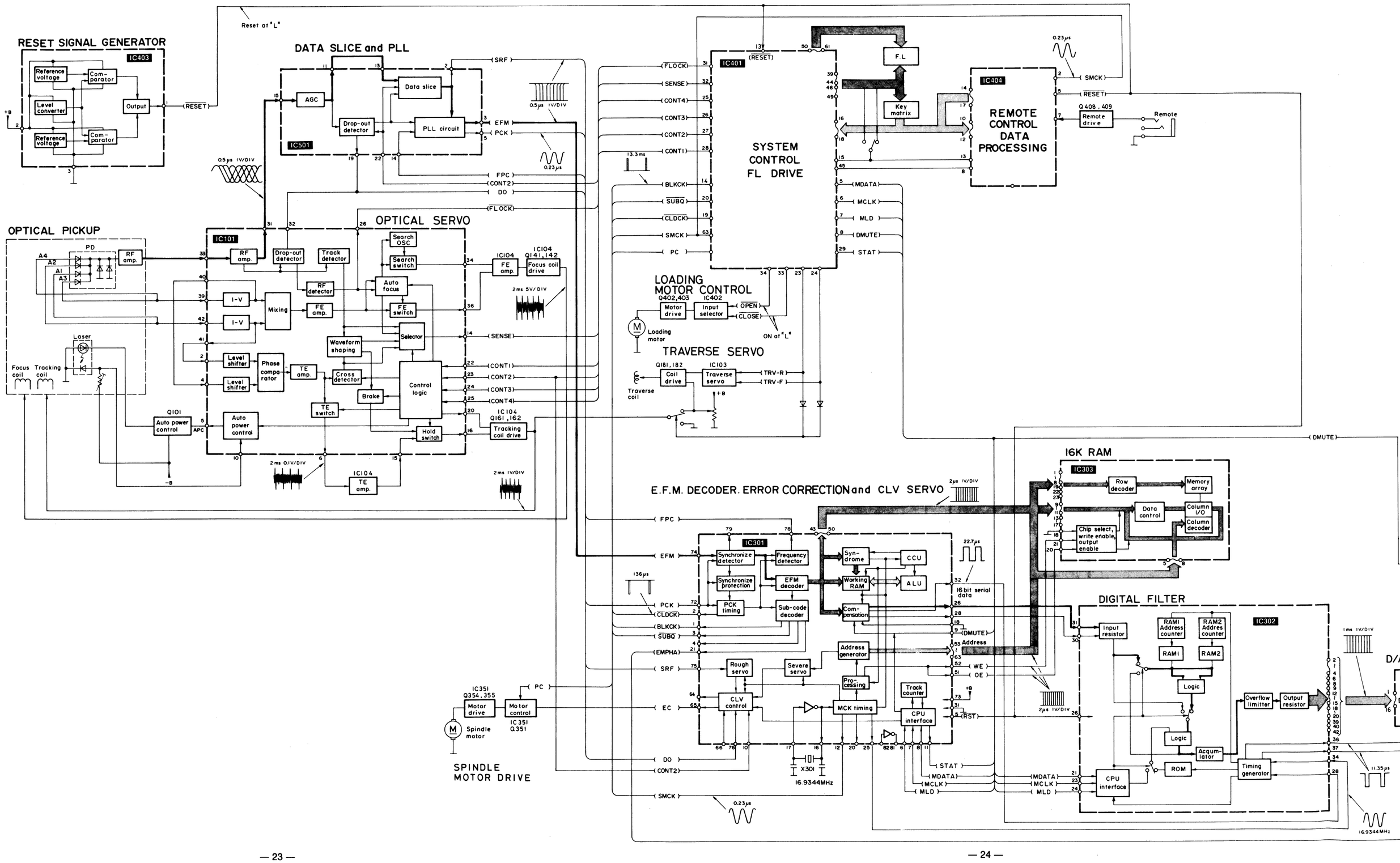
Resistor Type	Wattage	Tolerance
ERD : Carbon ERG : Metal Oxide ERX : Metal Film ERQ : Fuse Type Metal ERD□ L : Carbon (chip) ERO : Metal Film ERC : Solid	10 : 1/8W 12 : 1/2W 25 : 1/4W 1A : 1W 18 : 1/8W S2 : 1/4W S1 : 1/2W 2F : 1/4W 50 : 1/2W 2A : 2W	J : ±5% F : ±1% G : ±2% K : ±10%

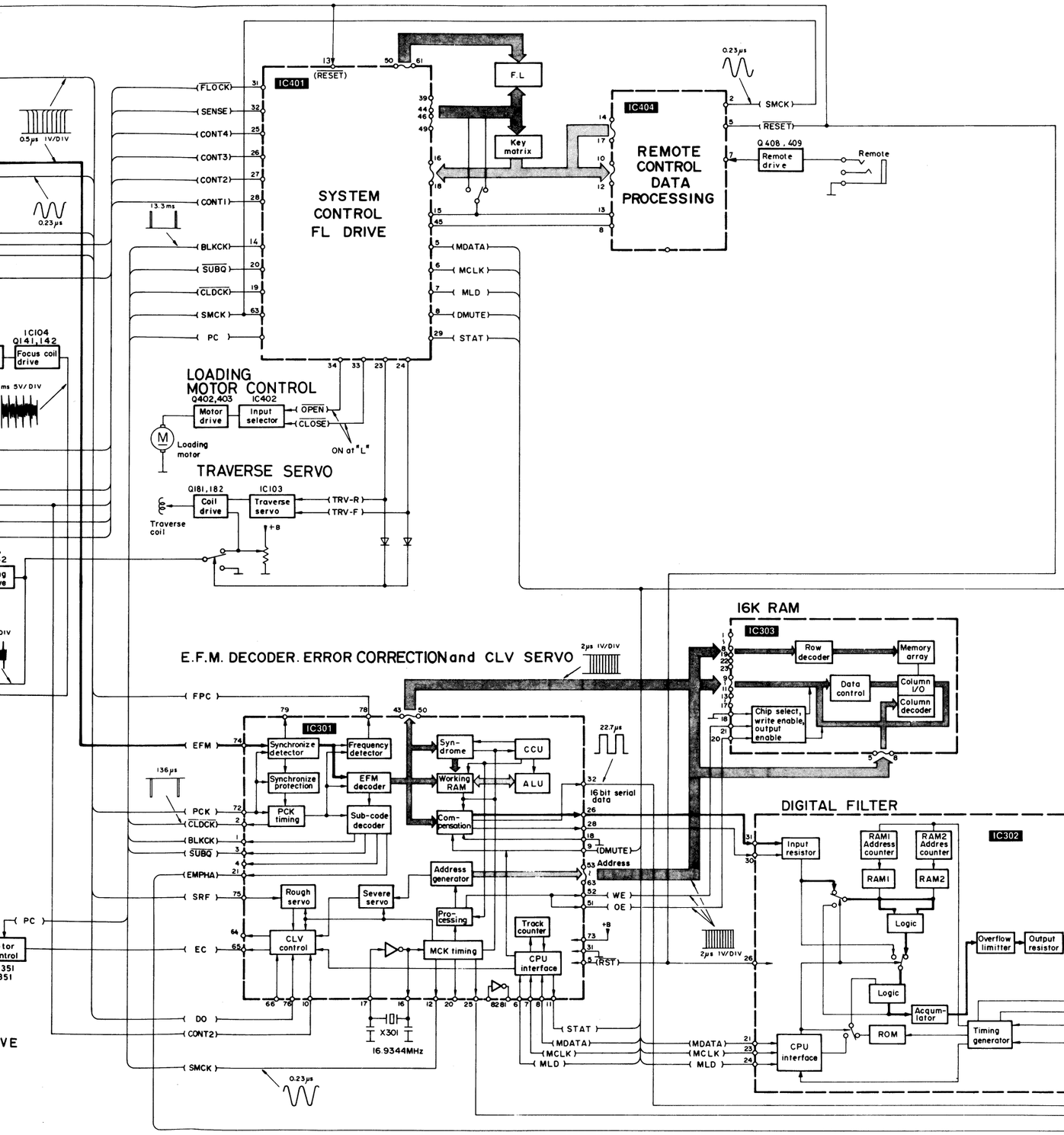
Capacitor Type	Voltage	Tolerance
ECE : Electrolytic ECCD : Ceramic ECKD : Ceramic ECQM : Polyester ECQP : Polyproylene ECG : Ceramic ECEA□□□N: Non Polar Electrolytic QCU□ : Ceramic (Chip Type) ECUX : Ceramic (Chip Type) ECF : Semiconductor EECW : Liquid electrolyte double layer capcitor	0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1H : 50V 1V : 35V 50 : 50V 05 : 50V 2H : 500V 2A : 100V 1 : 100V KC: 400V AC KC: 125VAC (UL) 1J : 63V	C : ±0.25pF J : ±5% K : ±10% Z : +80% −20% P : +100% −0% M : ±20% D : ±0.5pF G : ±2%

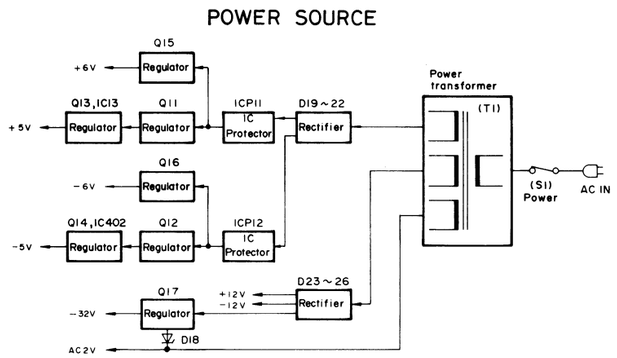
Ref. No.	Part No.	Part Code
RESISTORS		
R11, R12	ERDS2TJ681	001 152 2449 8
R13	ERDS2TJ221	001 152 2431 8
R14	ERDS2TJ101	001 152 2421 0
R15, R16	ERDS2TJ561	001 152 2364 2
R17	ERDS2TJ222	001 152 2353 5
R18	ERDS2TJ392	001 152 2439 0
R19	ERDS2TJ103	001 152 2347 3
R20	ERDS2TJ332	001 152 2357 1
R21	ERDS2TJ153	001 152 2351 7
R22, R23	ERDS2TJ682	001 152 2365 1
R24, R25	ERDS2TJ471	001 152 2361 5
R26	ERDS2TJ471	001 152 2361 5
R27	ERDS2TJ392	001 152 2439 0
R28	ERDS2TJ330	001 152 2355 3
R101	ERDS2TJ154	001 152 2427 4
R102, R103	ERDS2TJ472	001 152 2362 4
R104	ERDS2TJ223	001 152 2432 7
R105	ERDS2TJ334	001 152 2438 1
R107	ERDS2TJ473	001 152 2363 3
R108	ERDS2TJ332	001 152 2357 1
R109	ERDS2TJ822	001 152 2455 0
R110, R111	ERDS2TJ682	001 152 2365 1
R112	ERDS2TJ822	001 152 2455 0
R113, R114	ERDS2TJ152	001 152 2350 8
R115	ERDS2TJ102	001 152 2346 4
R116, R117	ERDS2TJ182	001 152 2352 6
R118	ERDS2TJ102	001 152 2346 4
R119	ERDS2TJ471	001 152 2361 5
R120	ERDS2TJ120	001 152 3146 6
R122	ERDS2TJ471	001 152 2361 5
R141	ERDS2TJ102	001 152 2346 4
R142	ERDS2TJ333	001 152 2358 0
R143	ERDS2TJ124	001 152 2425 6
R144	ERDS2TJ333	001 152 2358 0
R145	ERDS2TJ153	001 152 2351 7
R146	ERDS2TJ122	001 152 2423 8
R147	ERDS2TJ682	001 152 2365 1
R148	ERDS2TJ104	001 152 2348 2
R149	ERDS2TJ152	001 152 2350 8
R150	ERDS2TJ103	001 152 2347 3
R151	ERDS2TJ101	001 152 2421 0
R152	ERDS2TJ153	001 152 2351 7
R153	ERDS2TJ270	001 152 2434 5
R154	ERDS2TJ3R3	001 152 3152 8
R161	ERDS2TJ333	001 152 2358 0
R162	ERDS2TJ222	001 152 2353 5
R163	ERDS2TJ333	001 152 2358 0
R164	ERDS2TJ153	001 152 2351 7
R165	ERDS2TJ122	001 152 2423 8
R166	ERDS2TJ102	001 152 2346 4
R167	ERDS2TJ681	001 152 2449 8
R168	ERDS2TJ272	001 152 2354 4
R169	ERDS2TJ392	001 152 2439 0
R170	ERDS2TJ101	001 152 2421 0
R171	ERDS2TJ270	001 152 2434 5
R172	ERDS2TJ3R3	001 152 3152 8
R179	ERDS2TJ332	001 152 2357 1
R180	ERDS2TJ474	001 152 2443 4
R181	ERDS2TJ471	001 152 2361 5
R182, R183	ERDS2TJ564	001 152 2447 0
R184	ERDS2TJ223	001 152 2432 7
R185	ERDS2TKF4302	001 151 7115 2
R186, R187	ERDS2TKF4702	001 151 5723 2
R188	ERDS2TKF4702	001 151 5723 2
R189, R190	ERDS2TJ123	001 152 2424 7
R191	ERDS2TJ154	001 152 2427 4
R192	ERDS2TJ824	001 152 2457 8
R193	ERDS2TJ101	001 152 2421 0
R194	ERDS2TJ683	001 152 2450 5
R195, R196	ERDS2TJ103	001 152 2347 3
R197	ERDS2TJ473	001 152 2363 3
R198	ERDS2TJ393	001 152 2440 7
R302	ERDS2TJ472	001 152 2362 4
R303, R304	ERDS2TJ102	001 152 2346 4
R306	ERDS2TJ102	001 152 2346 4
R308	ERDS2TJ121	001 152 2349 1
R309	ERDS2TJ472	001 152 2362 4
R352	ERDS2TJ334	001 152 2438 1
R355, R356	ERDS2TJ333	001 152 2358 0
R357	ERDS2TJ123	001 152 2424 7
R358	ERDS2TJ103	001 152 2347 3
R359	ERDS2TJ274	001 152 2437 2
R361	ERDS2TJ103	001 152 2347 3
R362	ERDS2TJ8R2	001 152 5486 1
R363	ERDS2TJ101	001 152 2421 0
R406	ERDS2TJ394	001 152 2441 6
R407	ERDS2TJ152	001 152 2350 8
R409, R410	ERDS2TJ472	001 152 2362 4
R411, R412	ERDS2TJ472	001 152 2362 4
R413, R414	ERDS2TJ472	001 152 2362 4
R415	ERDS2TJ472	001 152 2362 4
R416	ERDS2TJ823	001 152 2456 9
R417	ERDS2TJ124	001 152 2425 6
R418	ERDS2TJ823	001 152 2456 9
R419	ERDS2TJ124	001 152 2425 6
R420	ERDS2TJ101	001 152 2421 0
R423	ERDS2TJ103	001 152 2347 3
R424	ERDS2TJ473	001 152 2363 3
R425, R426	ERDS2TJ103	001 152 2347 3
R427, R428	ERDS2TJ103	001 152 2347 3
R429, R430	ERDS2TJ222	001 152 2353 5
R431, R432	ERDS2TJ222	001 152 2353 5
R433	ERDS2TJ103	001 152 2347 3
R434	ERDS2TJ472	001 152 2362 4
R435, R436	ERDS2TJ822	001 152 2455 0
R501	ERDS2TJ224	001 152 2433 6
R502	ERDS2TJ562	001 152 2445 2
R503	ERDS2TJ474	001 152 2443 4
R504	ERDS2TJ221	001 152 2431 8
R505	ERDS2TJ104	001 152 2348 2
R506	ERDS2TJ333	001 152 2358 0
R507	ERDS2TJ102	001 152 2346 4
R801, R802	ERDS2TJ222	001 152 2353 5
R803, R804	ERDS2TJ272	001 152 2354 4
R805, R806	ERDS2TJ561	001 152 2364 2
R809, R810	ERDS2TJ473	001 152 2363 3
R811, R812	ERDS2TJ472	001 152 2362 4
R813, R814	ERDS2TJ472	001 152 2362 4
R815, R816	ERDS2TJ102	001 152 2346 4
R817	ERDS2TJ104	001 152 2348 2
R818	ERDS2TJ471	001 152 2361 5
R819	ERDS2TJ102	001 152 2346 4
R820	ERDS2TJ473	001 152 2363 3
CAPACITORS		
C1 ⚠	ECKDKC103PF2	001 103 3734 7
C2 ⚠	RXAF103Z22EY	001 230 0547 0

Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code	Ref. No.	Part No.	Part Code
C11, C12	ECFF1E104ZF	001 103 4992 7	C122, C123	ECKD1H101KB	001 103 1412 0	C401	ECFF1E104ZF	001 103 4992 7
C13	ECEA1CU470	001 120 2835 0	C124	ECKD1H222KB	001 103 1494 2	C402	ECEA0JU470	001 120 3125 9
C14	ECFF1E104ZF	001 103 4992 7	C125	ECEA0JU220	001 120 4670 5	C403	ECFTD103KXL	001 108 0341 7
C15, C16	ECEA1CU221	001 120 2833 2	C126	ECEA0JU470	001 120 3125 9	C405	ECFF1E104ZF	001 103 4992 7
C17, C18	ECFF1E104ZF	001 103 4992 7	C127, C128	ECKD1H102KB	001 103 1414 8	C406	ECCD1H220K	001 103 0493 7
C19, C20	ECEA1AU101	001 120 2830 5	C129	ECKD1H681K	001 103 1580 5	C408	ECFTD103KXL	001 108 0341 7
C21, C22	ECEA1CU222	001 120 3074 3	C141	ECQM1H153JZ	001 106 0704 0	C501	ECQM1H104JZ	001 106 0675 8
C23, C24	ECEA1CU331	001 120 3200 5	C142	ECQM1H122JZ	001 106 0683 8	C502	ECFF1E104ZF	001 103 4992 7
C25, C26	ECEA1VU101	001 120 2929 5	C143	ECQM1H473JZ	001 106 0810 9	C503	ECEA1CU100	001 120 2905 3
C27, C28	ECEA0JS331	001 120 2975 9	C144	ECEA1HSN2R2	001 120 3239 0	C504, C505	ECFF1E104ZF	001 103 4992 7
C29	ECEA1AU101	001 120 2830 5	C145	ECEA1HSNR22	001 120 4836 1	C506	ECCD1H150KC	001 103 0410 6
C30, C101	ECFF1E104ZF	001 103 4992 7	C161	ECQM1H153JZ	001 106 0704 0	C507	ECKD1H102KB	001 103 1414 8
C102, C103	ECKD1H102KB	001 103 1414 8	C162	ECKD1H681K	001 103 1580 5	C508	RBP1CN100CT	001 120 6146 2
C104	ECKD1H681K	001 103 1580 5	C163	ECQM1H103JZ	001 106 0667 8	C509	ECCD1H100KC	001 103 0321 6
C105, C106	ECKD1H471KB	001 103 1551 0	C164	ECEA1ESN3R3	001 120 5060 1	C510	ECQM1H104JZ	001 106 0675 8
C107	ECCD1H220K	001 103 0493 7	C165	ECEA1HSN0R1	001 120 4837 0	C511	ECEA1HUR47	001 120 3249 8
C108	ECEA1HS0R1	001 120 3250 5	C181	ECQM1H474JZ	001 106 2709 7	C512, C513	ECKD1H681K	001 103 1580 5
C109	ECEA1HU010	001 120 2842 1	C182	ECKD1H221KB	001 103 1487 1	C514	ECQM1H154JZ	001 106 0712 0
C110	ECQV1H104JZ	001 106 2571 7	C183	ECQM1H682JZ	001 106 0832 3	C515	ECQM1H153JZ	001 106 0704 0
C111, C112	ECEA1HU100	001 120 3251 4	C184	ECEA1HSN010	001 120 3237 2	C516	ECEA1HSN2R2	001 120 3239 0
C113	ECEA1HNR33BV	001 120 5949 9	C186	ECQM1H224JZ	001 106 0746 0	C517	ECKD1H471KB	001 103 1551 0
C114	ECKD1H182KB	001 103 1479 1	C187	ECEA1HSN2R2	001 120 3239 0	C801, C802	ECKD1H271KB	001 103 1515 4
C115	ECKD1H682KB	001 103 1592 1	C301	ECCD1H220K	001 103 0493 7	C803, C804	RBP1CN100CT	001 120 6146 2
C116	ECQM1H333JZ	001 106 0779 1	C302	ECCD1H070CC	001 103 0271 9	C805, C806	ECKD1H102KB	001 103 1414 8
C117	ECKD1H221KB	001 103 1487 1	C306, C307	ECFF1E104ZF	001 103 4992 7	C807	ECEA1HSN2R2	001 120 3239 0
C118	ECEA1HU010	001 120 2842 1	C310	ECFF1E104ZF	001 103 4992 7	C808, C809	ECEA0JU471	001 120 2924 0
C119	ECEA0JU220	001 120 4670 5	C351	ECKD1H222KB	001 103 1494 2	C810	ECEA0JU471	001 120 2924 0
C120	ECKD1H681K	001 103 1580 5	C352, C353	ECKD1H102KB	001 103 1414 8	C812	ECQV1H104JZ	001 106 2571 7
C121	ECFTD103KXL	001 108 0341 7	C354	ECFF1E563MR	001 108 1083 2	C817	ECFF1E104ZF	001 103 4992 7

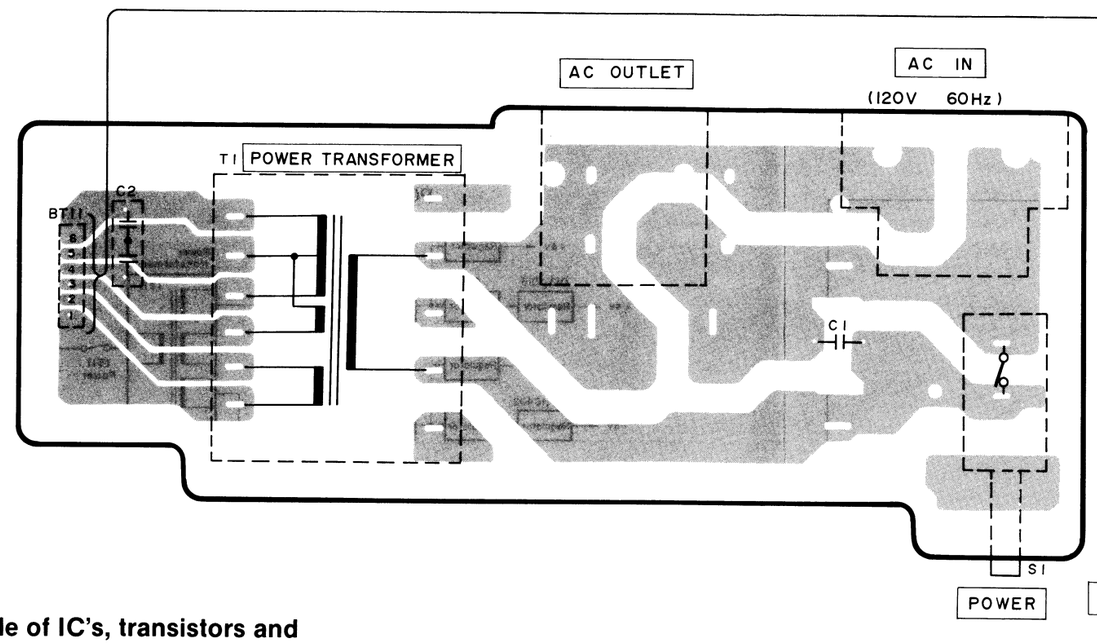
■ BLOCK DIAGRAM

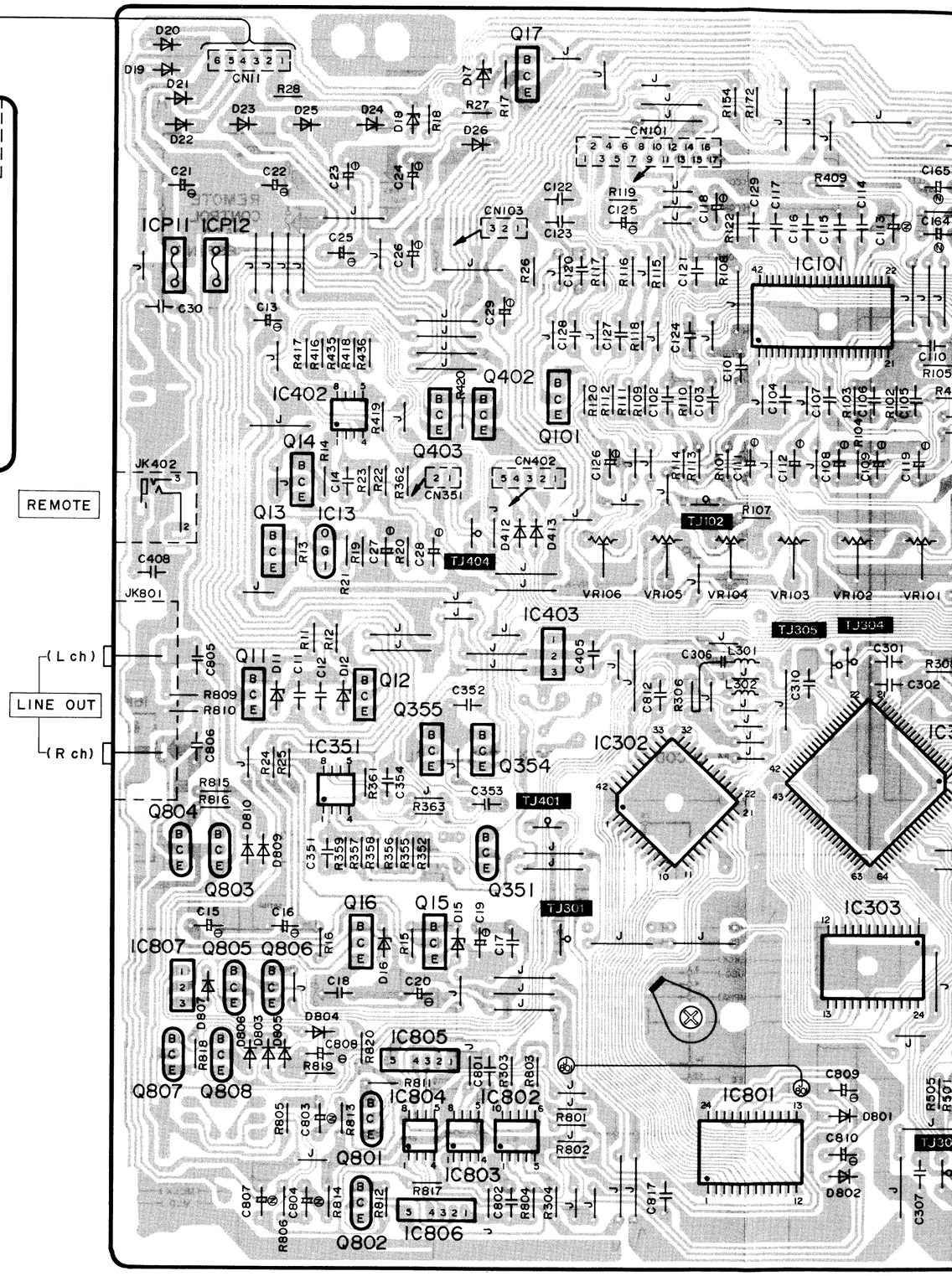



IC401
SYSTEM CONTROL FL DRIVE
(RESET)
(FLOCK)
(SENSE)
(CONT4)
(CONT3)
(CONT2)
(CONT1)
(BLKCK)
(SUBQ)
(CLDCK)
(SMCK)
PC
13.3ms
F.L
Key matrix
IC404
REMOTE CONTROL DATA PROCESSING
0.23µs
(SMCK)
(RESET)
Q408, 409
Remote drive
Remote
0.5µs 1V/DIV
0.23µs
IC104
Q141,142
Focus coil drive
ms 5V/DIV
LOADING MOTOR CONTROL
Q402,403
Motor drive
IC402
Input selector
(OPEN)
(CLOSE)
ON at "L"
Loading motor
TRAVERSE SERVO
Q181,182
Coil drive
IC103
Traverse servo
(TRV-R)
(TRV-F)
Traverse coil
+8
E.F.M. DECODER. ERROR CORRECTION and CLV SERVO
2µs 1V/DIV
FPC
IC301
EFM
Synchronize detector
Frequency detector
Synchronize protection
EFM decoder
PCK timing
Sub-code decoder
Syn-drome
CCU
Working RAM
ALU
Com-pensation
22.7µs
16 bit serial data
136µs
PCK
CLDCK
BLKCK
SUBQ
EMPHA
SRF
EC
DO
CONT2
SMCK
Address generator
Address
Rough servo
Severe servo
Pro-cessing
CLV control
MCK timing
Track counter
CPU interface
X301
16.9344MHz
0.23µs
(WE)
(OE)
(RST)
(DMUTE)
(MDATA)
(MCLK)
(MLD)
(STAT)
16K RAM
IC303
Row decoder
Memory array
Data control
Column I/O
Column decoder
Chip select, write enable, output enable
DIGITAL FILTER
IC302
Input resistor
RAM1 Address counter
RAM2 Addres counter
RAM1
RAM2
Logic
Logic
ROM
Acqum-lator
CPU interface
Overflow limitter
Output resistor
Timing generator
11.35µs
1ms 1V/DIV
D/A CONVERTER
IC801
Ladder resistor network
I-V
16.9344MHz
IC801, Q807,808
Muting drive
Q803
SW
Q804
SW
Deglitch
IC802
IC803
Sample hold
IC805
Low-pass filter
SW
Q801
Buffer
IC804
L ch
IC802
Deglitch
IC803
Sample hold
IC806
Low-pass filter
SW
Q802
Buffer
IC804
R ch
Q805,806
Emphasis drive

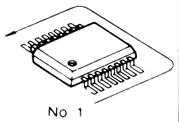
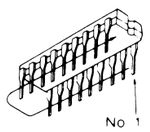
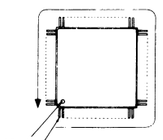
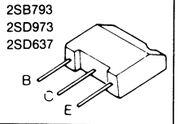
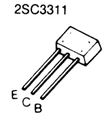
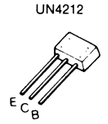
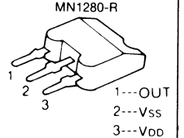
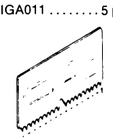
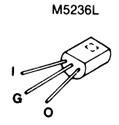
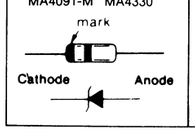
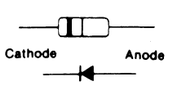
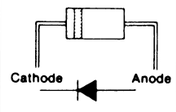

POWER SOURCE
Q15
+6V
Regulator
Q13,IC13
+5V
Regulator
Q11
Regulator
ICP11
IC Protector
D19~22
Rectifier
Power transformer
(T1)
Q16
-6V
Regulator
Q14,IC402
-5V
Regulator
Q12
Regulator
ICP12
IC Protector
(S1) Power
AC IN
Q17
-32V
Regulator
+12V
-12V
D23~26
Rectifier
D18
AC2V

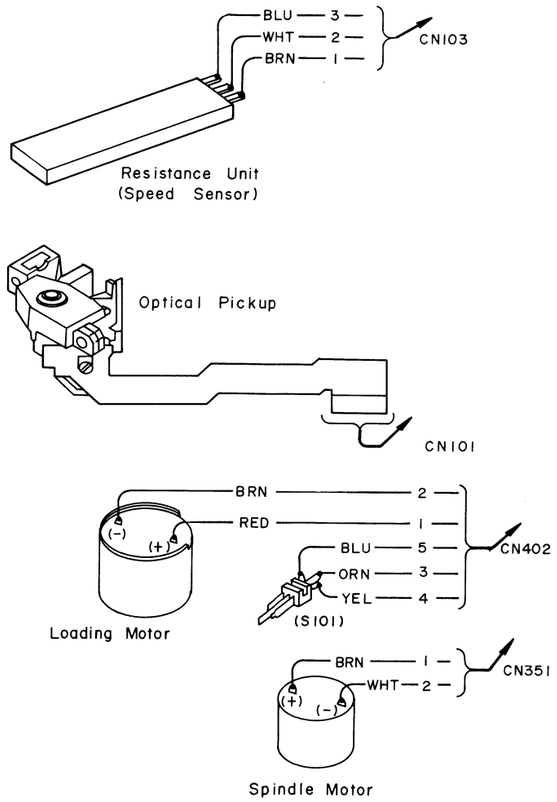
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



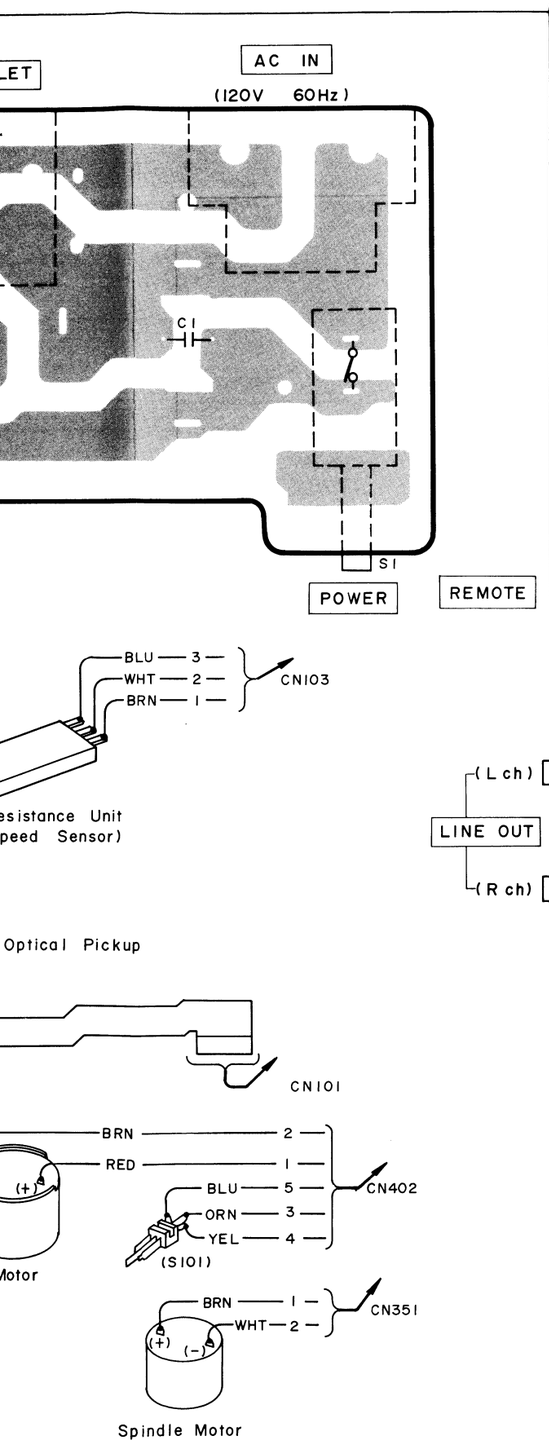


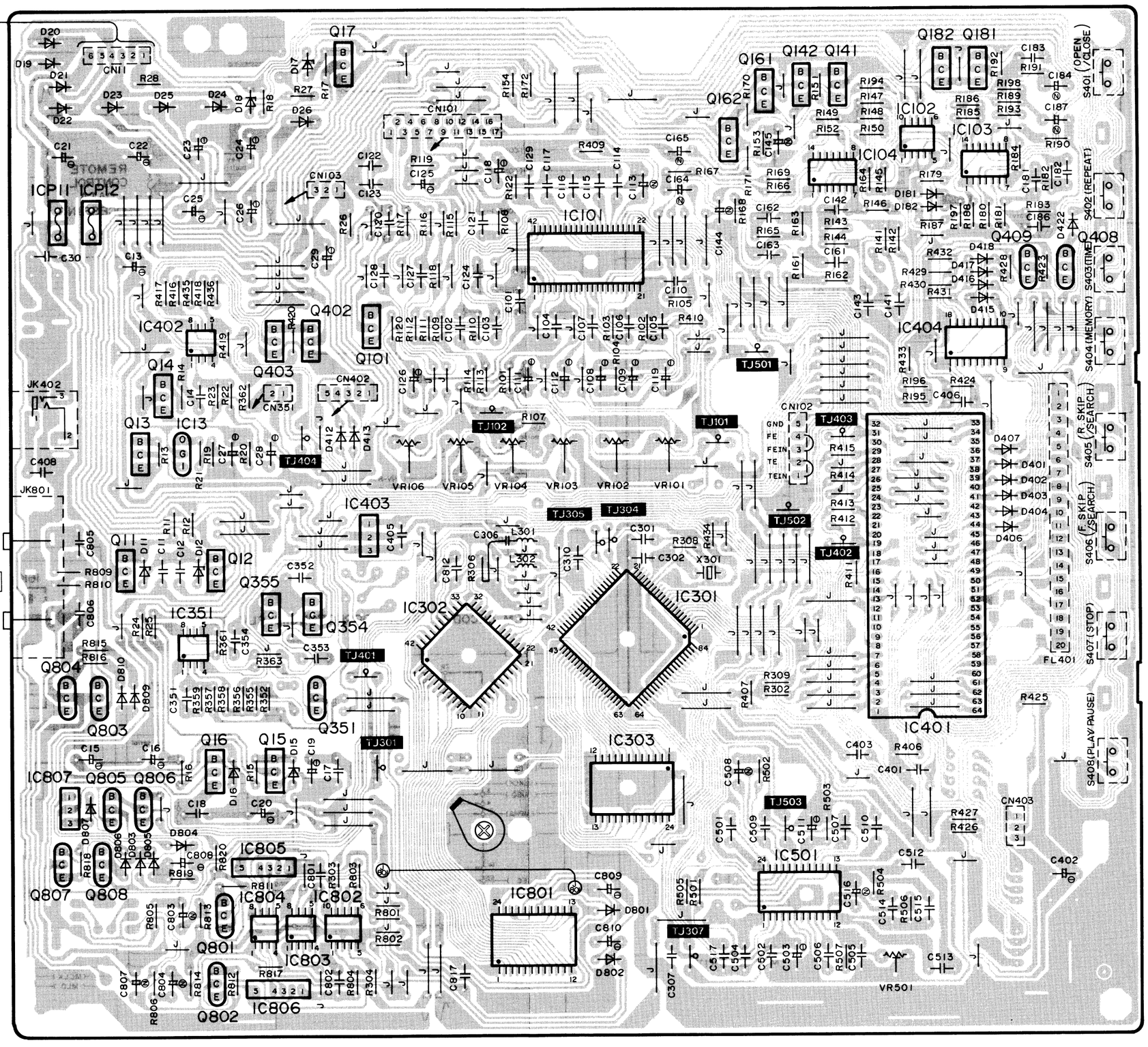
- **Terminal guide of IC's, transistors and diodes**

AN8370S ..... 42 pin SVIL833M ..... 8 pin SVIBA4560F ..... 8 pin AN6552 ..... 8 pin MN6636S ..... 10 pin AN6554NS ..... 14 pin MN1550PDT ..... 18 pin AN8371S ..... 24 pin SVICXK5816M .... 24 pin	MN15261PDU .... 64 pin SVIPCM55HP-2 ... 24 pin	MN6617S ..... 84 pin MN6618A ..... 42 pin
		
2SB1862 2SB793 2SD973 2SD637	2SD1450 2SC3311	UN4112 UN4212
		
MN1280-R	SVIGA011 ..... 5 pin	M5236L
		
MA4068 MA4056 MA4091-M MA4330	MA165	SVD1SR35200A
		



AM


LET
AC IN
(120V 60Hz)
S1
POWER
REMOTE
BLU — 3 —
WHT — 2 — CN103
BRN — 1 —
esistance Unit
peed Sensor)
Optical Pickup
CN101
BRN — 2
RED — 1
BLU — 5
ORN — 3 CN402
YEL — 4
(S101)
Motor
BRN — 1 —
WHT — 2 — CN351
(+) (−)
Spindle Motor
(L ch)
LINE OUT
(R ch)


CN11
CN101
CN103
CN402
CN351
ICP11 ICP12
IC101
IC301
IC302
IC303
IC401
IC402
IC403
IC404
IC501
IC801
IC802
IC803
IC804
IC805
IC806
IC807
IC13
IC102
IC103
IC104
IC351
Q17
Q101
Q402
Q403
Q14
Q13
Q11
Q12
Q355
Q354
Q804
Q803
Q16
Q15
Q351
Q807
Q808
Q805
Q806
Q801
Q802
Q161
Q162
Q142 Q141
Q182 Q181
Q409
Q408
TJ101
TJ102
TJ301
TJ304
TJ305
TJ307
TJ401
TJ402
TJ403
TJ404
TJ501
TJ502
TJ503
VR101
VR102
VR103
VR104
VR105
VR106
VR501
JK402
JK801
D20
D19
D21
D22
D23
D25
D24
D26
D17
D18
D407
D401
D402
D403
D404
D406
D415
D416
D417
D418
D422
D801
D802
FL401
S401 (OPEN /CLOSE)
S402 (REPEAT)
S403 (TIME)
S404 (MEMORY)
S405 (R. SKIP /SEARCH)
S406 (F. SKIP /SEARCH)
S407 (STOP)
S408 (PLAY/PAUSE)
GND
FE
FEIN
TE
TEIN

■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with development of new technology.)

Notes:

1. **S1** : Power switch in "**on**" position.
2. **S101** : Disc holder open/close detection switch.
3. **S401** : Open/close switch.
4. **S402** : Repeat switch.
5. **S403** : Time mode select switch.
6. **S404** : Memory/recall switch.
7. **S405** : Backward skip switch.
8. **S406** : Forward skip switch.
9. **S407** : Stop/clear switch.
10. **S408** : Play/pause switch.
11. The voltage value and waveform are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.
    * The parenthesized are the values of voltage generated during playing (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.
12. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
13. ——— : Positive voltage lines and negative voltage lines.
    ⋯⋯ : Audio signal lines.

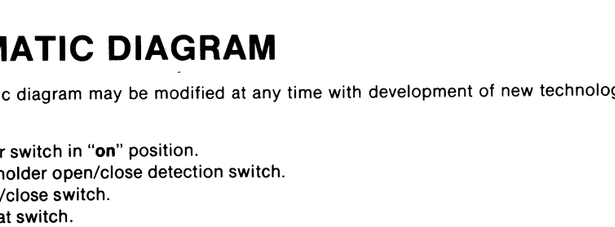
Caution!

IC and LSI are aensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

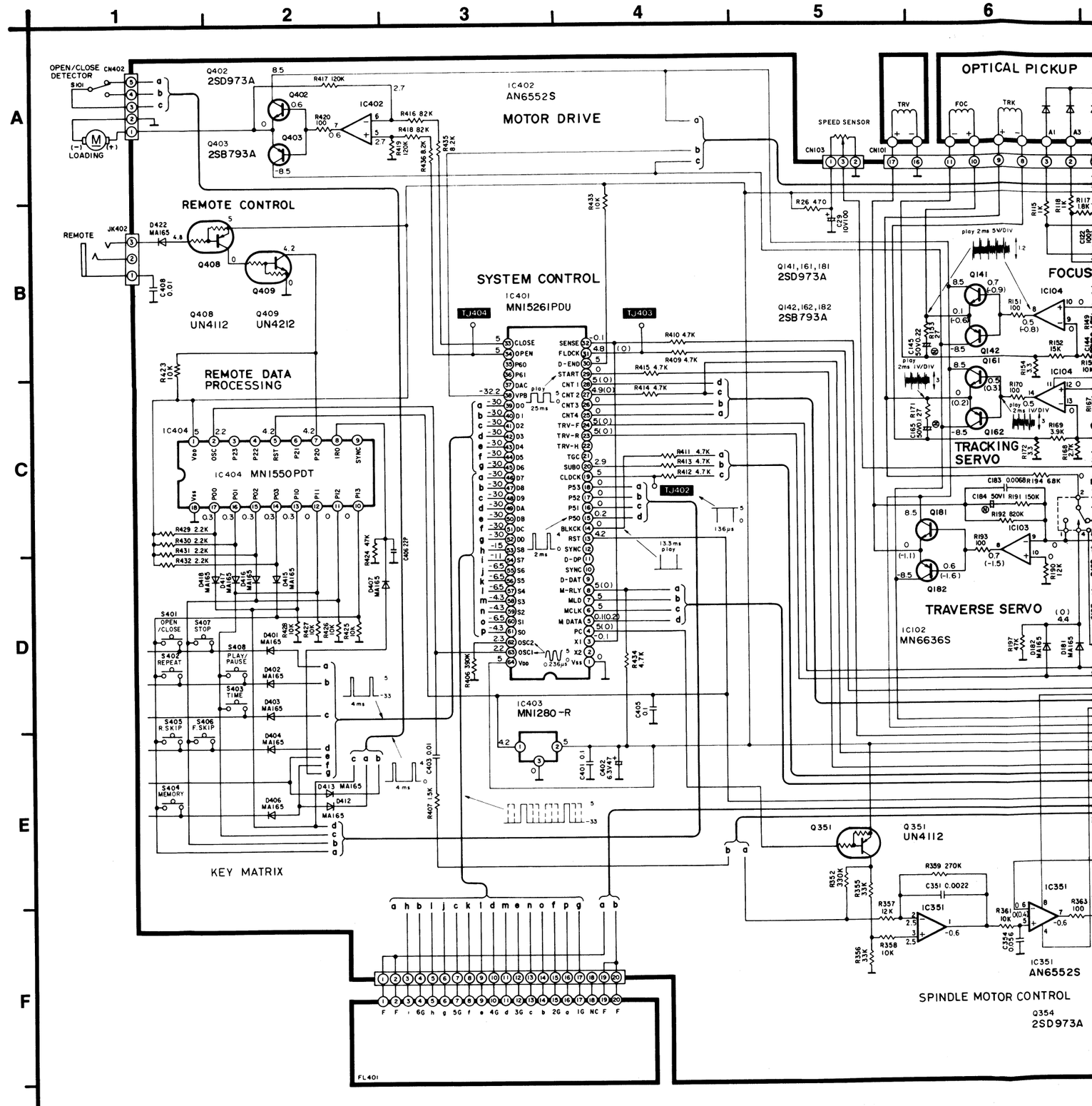
■ Internal connection of FL

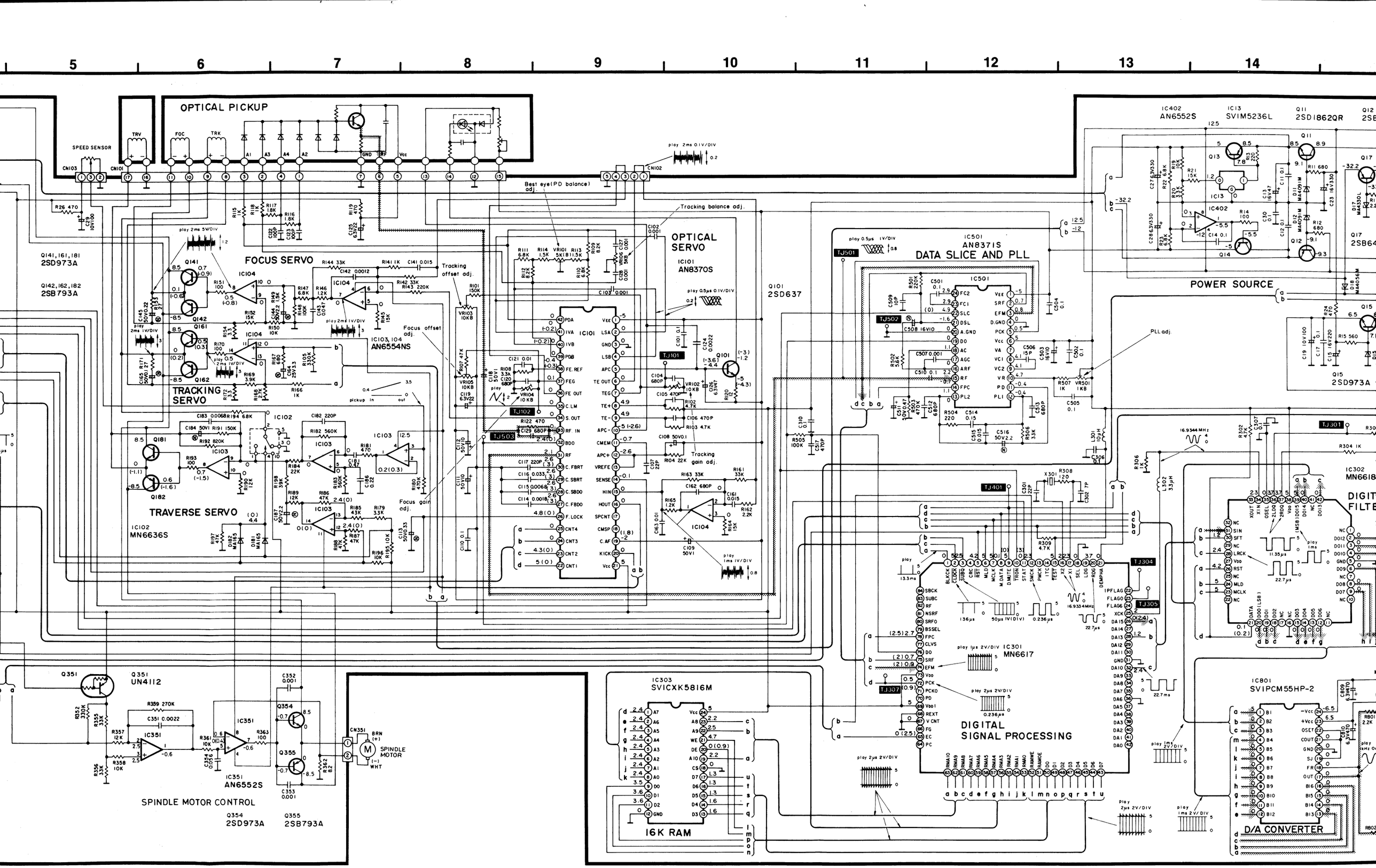
• Grid connection diagram

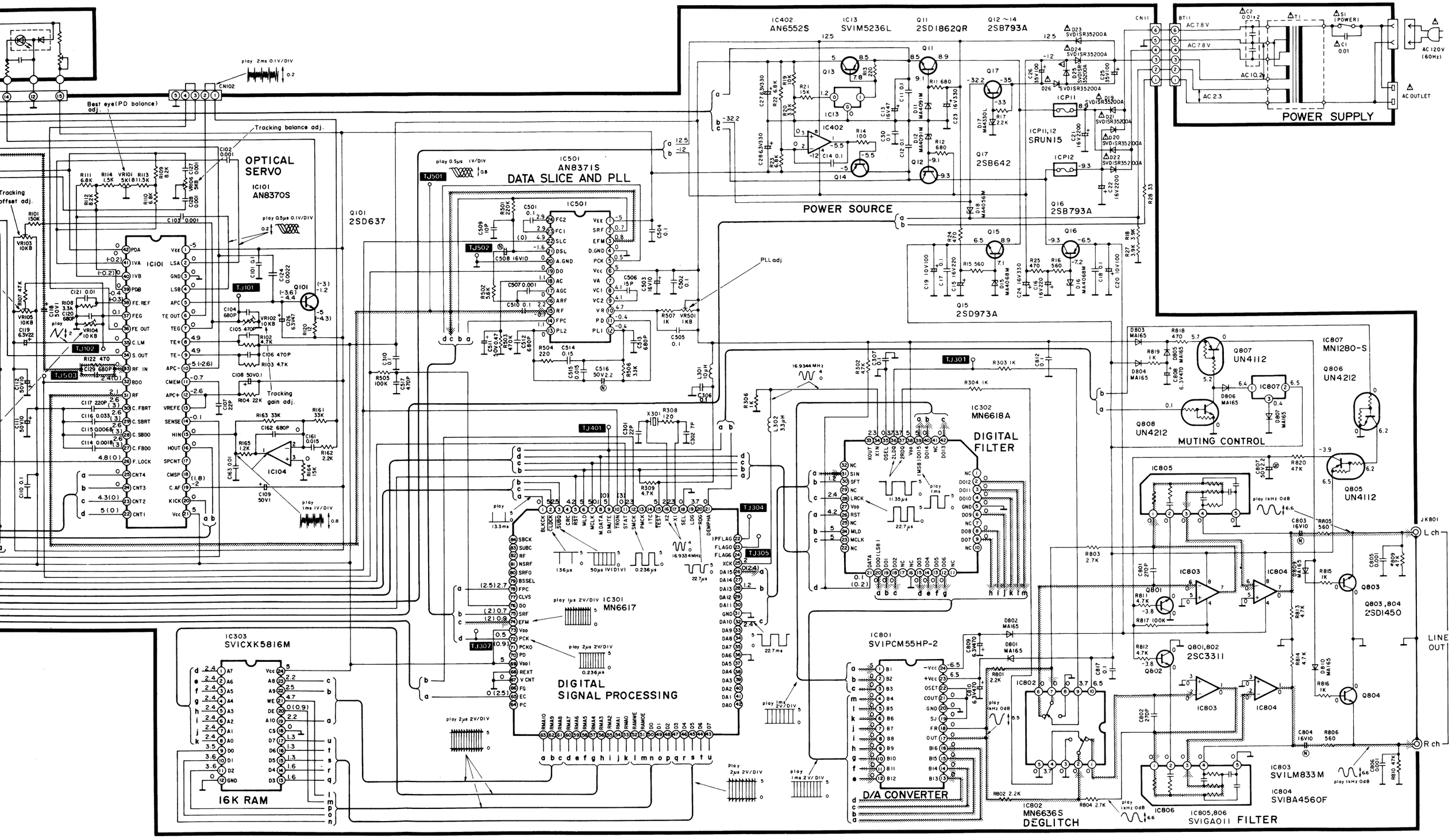


• Anode connection table

	6G	5G	4G	3G	2G	1G
a	a	a	a	a	a	a
b	b	b	b	b	b	b
c	c	c	c	c	c	c
d	d	d	d	d	d	d
e	e	e	e	e	e	e
f	f	f	f	f	f	f
g	g	g	g	g	g	g
h	-	-	disc	-	col	-
i	-	-	—	↻	❚❚	▶




5
6
7
8
9
10
11
12
13
14
OPTICAL PICKUP
SPEED SENSOR
TRV
FOC
TRK
A1
A3
A4
A2
GND
RF
Vcc
CN103
CN101
CN102
play 2ms 0.1V/DIV
Best eye(PD balance) adj.
Tracking balance adj.
OPTICAL SERVO
IC101
AN8370S
Q101
2SD637
play 0.5μs 1V/DIV
play 0.5μs 0.1V/DIV
FOCUS SERVO
Tracking offset adj.
Focus offset adj.
IC104
IC103, 104
AN6554NS
TRACKING SERVO
play 2ms 5V/DIV
play 2ms 1V/DIV
pickup in
pickup out
Q141, 161, 181
2SD973A
Q142, 162, 182
2SB793A
Q141
Q142
Q161
Q162
TRAVERSE SERVO
IC102
MN6636S
Q181
Q182
Focus gain adj.
Tracking gain adj.
TJ101
TJ102
TJ503
IC501
AN8371S
DATA SLICE AND PLL
TJ501
TJ502
PLL adj.
IC402
AN6552S
IC13
SVIM5236L
Q11
2SD1862QR
POWER SOURCE
Q15
2SD973A
TJ401
TJ304
TJ305
TJ307
TJ301
play 1μs 2V/DIV
IC301
MN6617
DIGITAL SIGNAL PROCESSING
IC302
MN6618
DIGIT FILTE
IC801
SVIPCM55HP-2
D/A CONVERTER
IC303
SVICXK5816M
16K RAM
Q351
UN4112
SPINDLE MOTOR CONTROL
IC351
AN6552S
Q354
2SD973A
Q355
2SB793A
CN351
SPINDLE MOTOR
BRN (+)
WHT (-)


OPTICAL SERVO
IC101 AN8370S
DATA SLICE AND PLL
IC501 AN8371S
POWER SOURCE
IC402 AN6552S
IC13 SVIM5236L
Q11 2SD1862QR
Q12 ~14 2SB793A
Q15 2SD973A
Q16 2SB793A
Q17 2SB642
ICP11
ICP11,12 SRUN15
ICP12
POWER SUPPLY
AC 7.8V
AC 7.8V
AC 10.2V
AC 23
AC 120V (60Hz)
AC OUTLET
Q101 2SD637
PLL adj.
Best eye(PD balance) adj.
Tracking balance adj.
Tracking offset adj.
Tracking gain adj.
play 2ms 0.1V/DIV
play 0.5μs 1V/DIV
play 0.5μs 0.1V/DIV
play 1μs 2V/DIV
play 2μs 2V/DIV
play 1ms 1V/DIV
play 1ms 2V/DIV
IC303 SVICXK5816M
16K RAM
IC301 MN6617
DIGITAL SIGNAL PROCESSING
IC302 MN6618A
DIGITAL FILTER
IC801 SVIPCM55HP-2
D/A CONVERTER
IC802 MN6636S
DEGLITCH
IC807 MN1280-S
Q807 UN4112
Q806 UN4212
Q808 UN4212
MUTING CONTROL
Q805 UN4112
Q801
Q803,804 2SD1450
Q801,802 2SC3311
Q802
IC803 SVILM833M
IC804 SVIBA4560F
IC805,806 SVIGA011 FILTER
L ch
R ch
LINE OUT
JK801

■ TERMINAL FUNCTION OF LSI

• MN6617 (Digital Signal Processing : EFM Decoder, Error Correction, CLV Servo)

Pin No.	Mark	I/O	Function
1	BLKCK	O	Sub-code block (Q data) clock (75 Hz)
2	$\overline{\text{CLDCK}}$	O	Sub-code frame (Q data) clock (7.35 kHz)
3	$\overline{\text{SUBQ}}$	O	Sub-code (Q data) output
4	CRC	O	Sub-code (Q data) CRC check (Not used, open)
5	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
6	MLD	I	Command load input
7	MCLK	I	Command clock input
8	MDATA	I	Command data input
9	DMUTE	I	Muting control (muting ON at "H")
10	$\overline{\text{TRON}}$	I	Tracking servo ON signal (tracking servo ON at "L")
11	STAT	O	Processing condition (CRC, OTC, CLVOK, TT STOP) output
12	SMCK	O	Clock output (4.2336 MHz)
13	PMCK	O	Pitch control clock output (Not used, open)
14	ITC	I	Track counter input signal (Not used, open)
15	$\overline{\text{TEST}}$	I	Test mode selection (Not used, connected to +5V)
16	X2	O	Clock output (16.9344 MHz)
17	X1	I	Clock input (16.9344 MHz)
18	SEL	I	DA output parallel/serial selection (serial at "L")
19	LDG	O	L channel deglitch signal (Not used)
20	RDG	O	Clock output (Spindle motor control)
21	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")
22	IPFLAG	O	Interpolation flag (interpolation at "H")
23	FLAG0	O	Error flag (error at "H")
24	FLAG6	O	16 K RAM address reset signal (reset at "H")
25	XCK	O	Clock (16.9344 MHz) output
26	DA15	O	16-bit data output
27	DA14	O	16-bit data output (Not used)
28	DA13	O	16-bit data output
29	DA12	O	16-bit data output (Not used)
30	DA11	O	16-bit data output (Not used)
31	GND	I	GND terminal
32	DA10	O	16-bit data output
33	DA9	O	16-bit data output (Not used)
34	DA8	O	16-bit data output (Not used)
35	DA7	O	16-bit data output (Not used)
36	DA6	I/O	16-bit data output (Not used)
37	DA5	O	16-bit data output (Not used)
38	DA4	O	16-bit data output (Not used)
39	DA3	O	16-bit data output (Not used)
40	DA2	O	16-bit data output (Not used)
41	DA1	O	16-bit data output (Not used)
42	DA0	O	16-bit data output (Not used)
43 ⟩ 50	D7 ⟩ D0	I/O	16 K RAM data output
51	RAMOE	O	16 K RAM $\overline{\text{OE}}$ signal
52	RAMWE	O	16 K RAM $\overline{\text{WE}}$ signal
53 ⟩ 63	RAMA 0 ⟩ RAMA10	O	16 K RAM address signal (RAMA0 : LSB, RAMA10: MSB)
64	PC	O	Spindle motor ON signal (ON at "L")
65	EC	O	Spindle motor drive signal
66	FG	I	Spindle motor FG signal input
67	VCNT	——	————
68	REXT	——	————
69	VDD	I	Power supply (Connected to +5V)
70	PD	——	————
71	PCKO	——	————
72	PCK	I	PLL extract clock input
73	VDD	I	Power supply (connected to +5V)
74	EFM	I	EFM signal input (PLL)
75	SRF	I	EFM signal input (DSL)
76	DO	I	Drop-out signal (Drop-out at "H")
77	CLVS	O	11T servo OK signal (OK at "H")
78	FPC	O	PLL frequency comparision signal
79	BSSEL	O	PLL frequency in take operation signal. (Not used)
80	SRFO	——	————
81	NSRF	——	————
82	RF	——	————
83	SUBC	O	Sub-code serial output data (Not used)
84	SBCK	I	Clock for sub-code serial output (Not used)

• AN8370S (Optical Servo Control)

Pin No.	Mark	I/O	Function
1	VEE	I	Power supply (connected to −5V)
2	LSA	I	Phase difference input (A)
3	GND	I	GND terminal
4	LSB	I	Phase difference input (B)
5	APC	O	Auto laser power control output
6	TEOUT	O	Tracking error signal output
7	TEG	I	Tracking error gain adjusting input
8	TE+	I	Phase difference-to-voltage conversion (+)
9	TE−	I	Phase difference-to-voltage conversion (−)
10	APC−	I	Laser power inversion input
11	C·MEM	I	Capacitor connection for phase difference memory
12	APC+	I	Laser power input
13	VREF	O	Reference current generation
14	SENSE	O	Selector output (track-crossed)
15	HIN	I	Tracking hold circuit input
16	HOUT	O	Tracking hold circuit output
17	SPCNT	O	Track-cross speed control output (not used, open)
18	C·MSP	I	Track-cross reference speed setting capacitor connection (not used, open)
19	C·AF	I	Auto focus timer capacitor connection
20	KICK	O	Track kick signal output
21	VCC	I	Power supply (connected to +5V)
22	CNT1	I	Control input ($\overline{\text{FOON}}$: Focus servo ON signal)
23	CNT2	I	Control input ($\overline{\text{TRON}}$: Tracking servo ON signal)
24	CNT3	I	Control input (KICKF: Kick direction [Forward] command)
25	CNT4	I	Control input (KICKR: Kick direction [Reverse] command)
26	$\overline{\text{F·LOCK}}$	O	Focus lock signal output
27	C·FBDO	O	Capacitor connection for inversion RF high speed detection
28	C·SBDO	O	Capacitor connection for inversion RF low speed detection
29	C·SBRT	O	Capacitor connection for non-inversion RF low speed detection
30	C·FBRT	O	Capacitor connection for non-inversion RF high speed detection
31	RF OUT	O	RF signal output
32	BDO	O	Drop-out detection output
33	RF IN	I	RF signal input
34	S·OUT	O	Focus search signal output
35	C·LW	I	Capacitor connection for triangular wave generation
36	FE·OUT	O	Focus error signal output
37	FEG	I	Focus error gain adjusting input
38	FE·REF	I	Focus error comparison voltage generation
39	PDB	I	Photo detector current input (B)
40	IVB	O	Current to voltage conversion (B)
41	IVA	O	Current to voltage conversion (A)
42	PDA	I	Photo detector current input (A)

• AN8371S (Data slice and PLL)

Pin No.	Mark	I/O	Function
1	VEE	I	Power supply (connected to −5V)
2	SRF	O	RF signal output data-sliced into digital value
3	EFM	O	EFM signal output synchronized with PCK
4	D·GND	I	GND terminal (digital system)
5	PCK	O	Clock output extracted from SRF
6	VCC	I	Power supply (connected to +5V)
7	VA	I	VCO free ran frequency adjusting current input
8	VC1	I	Capacitor connection for VCO oscillation frequency
9	VC2	I	Capacitor connection for VCO oscillation frequency
10	VR	I	Resistor connection for VCO oscillation frequency
11	PD	I	Capacitor connection for PLL DO protection
12	PL1	I	PLL loop filter constant connection
13	PL2	I	PLL loop filter constant connection
14	FPC	I	Frequency comparison error signal input
15	RF	I	RF signal input
16	ARF	O	RF signal output with AGC applied
17	AGC	I	ARF signal input for AGC drop-out detection
18	AC	I	AGC loop filter constant connection
19	DO	O	Drop-out detection pulse output
20	A·GND	I	GND terminal (analog system)
21	DSL	I	RF signal input for data slicer
22	SLC	I	Slice level control signal input
23	FC1	I	Data slicer filter capacitor connection
24	FC2	I	Data slicer filter capacitor connection

• MN15261F

Pin No.	Mark
1	VSS
2	XO
3	XI
4	P00
5	P01
6	P02
7	P03
8	P10
9	P11
10	P12
11	P13
12	SYNC
13	RST
14	IRQ
15 ⟩ 18	P50 ⟩ P53
19	SBT
20	SBD
21	P20
22	P21
23	P22
24	P23
25	P30

• MN1550F

Pin No.	Mark
1	VDD
2	OSC1
3	OSC2
4	P22
5	RST
6	P21
7	P20
8	IRQ

• MN15261PDU (System Control and FL Drive)

Pin No.	Mark	Signal	I/O	Function
1	VSS	GND	I	GND terminal
2	XO	—	O	Not used (Open)
3	XI	SENSE	I	Optical servo condition input
4	P00	PC	O	Spindle moter control
5	P01	M DATA	O	Command data outut
6	P02	MCLK	O	Command clock output
7	P03	MLD	O	Command load output
8	P10	MRLY	I	Muting control
9	P11	D-DAT	I	(Not used, open)
10	P12	SYNC	I	(Not used, open)
11	P13	D-DP	I	(Not used, open)
12	SYNC	—	O	(Not used, open)
13	RST	RESET	I	Reset signal input (reset at "L")
14	IRQ	BLKCK	I	Sub-code block (Q data) clock (75 Hz) input
15 ~ 18	P50 ~ P53	KEY	I	Key scan input
19	SBT	CLDCK	I	Sub-code frame clock (7.35 kHz)
20	SBD	SUBQ	I	Sub-code Q data input
21	P20	TGC	O	(Not used, open)
22	P21	TRV-H	O	(Not used, open)
23	P22	TRV-R	O	Traverse reverse command signal
24	P23	TRV-F	O	Traverse forward command signal
25	P30	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [Reverse] command)
26	P31	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [Forward] command)
27	P32	CNT2	O	Optical servo IC control signal (TRON: Tracking servo)
28	P33	CNT1	O	Optical servo IC control signal (FOON: Focus servo)
29	P40	START	I	Key input strobe and processing status input from signal processing LSI traverse position detection.
30	P41	D-END	O	Connected to 5V
31	P42	FLOCK	I	Optical servo condition (focus) input
32	P43	SENSE	I	Optical servo condition (track cross) input
33	PE0	CLOSE	O	Loading motor close signal
34	PE1	OPEN	O	Loading motor open signal
35	P60	PAUSE	O	(Not used, open)
36	P61	PLAY	O	(Not used, open)
37	DAC	DAC	O	(Not used, open)
38	VPP	—	I	FL drive power supply (connected to −32V)
39 ~ 52	D0 ~ DD	—	O	FL grid signal and key scan signal
53 ~ 61	S8 ~ S0	—	O	FL anode signal
62	OSC2	—	I	Clock terminal
63	OSC1	—	I	Clock input
64	VDD	—	I	Power supply (connected to +5V)

• MN1550PDT (Remote Control Signal Processing)

Pin No.	Mark	Signal	I/O	Function
1	VDD	——	I	Power supply (connected to +5V)
2	OSC1	SMCK	I	Clock input
3	OSC2	——	——	Not used, open
4	P22	——	——	Not used, open
5	RST	RESET	I	Reset signal input
6	P21	——	——	Not used, open
7	P20	——	I	Remote control signal input
8	IRQ	——	I	Program enable/de-enable control
9	P31	SYNC	O	Not used, open
10 ~ 13	P13 ~ P10	Data	I	Key strobe
14 ~ 17	P03 ~ P00	Data	I	Key strobe
18	VSS	GND	I	GND terminal

• MN6618A (Digital Filter)

Pin No.	Mark	I/O	Function
1	NC	—	Not connected
2	D012	O	16-bit data output
3	D011	O	16-bit data output
4	D010	O	16-bit data output
5	GND	I	GND terminal
6	D09	O	16-bit data output
7	NC	—	Not connected
8	D08	O	16-bit data output
9	D07	O	16-bit data output
10	NC	—	Not connected
11	NC	—	Not connected
12	D06	O	16-bit data output
13	D05	O	16-bit data output
14	D04	O	16-bit data output
15	D03	O	16-bit data output
16	NC	—	Not connected
17	NC	—	Not connected
18	D02	O	16-bit data output
19	D01	O	16-bit data output
20	D00	O	16-bit data output
21	MDATA	I	Command data input
22	NC	—	Not connected
23	MCLK	I	Command clock input
24	MLD	I	Command load input
25	NC	—	Not connected
26	RST	I	Reset signal input (reset at "L")
27	—	—	————
28	LRCK	I	L/R channel changeover signal
29	NC	—	Not connected
30	SFT	I	Serial data input clock
31	SIN	I	Serial data input
32	NC	—	Not connected
33	X OUT	O	Clock output (Not used, open)
34	X IN	I	Clock input (16.9244 MHz)
35	OSEL	I	DA output parallel/serial changeover (Parallel at "L")
36	LDGL	O	L channel deglitch signal
37	RDGL	O	R channel deglitch signal
38	VDD	I	Power supply (connected to +5V)
39	D015	O	16-bit data output (MSB)
40	D014	O	16-bit data output
41	NC	—	Not connected
42	D013	O	16-bit data output

Printed in Japan
S870302300JN/HS
S870314100JN/HS
S870500500JN/HS